Ethnic migration patterns in South Africa:
A case of Zimbabwean Immigrants

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ABSTRACT

Zimbabwean-born migrants form the largest proportion of the foreign-born population in South Africa; however, relatively little is known about both the international and internal migration behaviour of this population group. This study reviews several migration theories, and existing evidence on Zimbabwean-born migration to South Africa and uses the 2011 Census and 2016 Community Survey data for South Africa to explore both provincial and metropolitan migration patterns of Zimbabwean migrants. The study also seeks to identify characteristics of migrant internal movers and how these are associated with their propensity to migrate.

To accomplish this, two modelling approaches are used, namely: the multiplicative component model (TODA) and the logistic regression model. The first modelling approach describes the origin-destination specific migration patterns of this group of migrants. The results from this analytic model show that Zimbabwean migrants are concentrated in three provinces, namely, Gauteng, Western Cape, and Limpopo; particularly in respective metropolitan areas. Also, post-arrival migration is largely focused on these major receiving provinces. The findings suggest that this pattern of concentration is likely to continue.

The second modelling approach examines the inter-provincial migration of Zimbabwean migrants. At the aggregate level, the study results show a degree of selectivity of Zimbabwean immigration by factors such as age, sex, marital status, and education. Also, the results show that post-immigration migration is not necessarily significant to migrants' redistribution. However, for those who move, the logistic regression analysis reveals that province of residence, age, marital status, and sex significantly impact on migrants' propensity to move from "pioneer settlements" and their effects are consistent over time.

Finally, despite concerns about the quality of the data collected in the 2011 census and 2016 Community Survey, our results show that there is general consistency of migration 'patterns' between the two datasets.

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1 INTRODUCTION

Zimbabwe is a landlocked country in Southern Africa which borders on South Africa, Botswana, Zambia, and Mozambique. Since its independence in 1980, Zimbabwe has faced several economic and political problems which have led to a dynamic change in its migration patterns. Historically, Zimbabwe has been both a migrant sending and receiving country, with many labour migrants from neighboring countries such as Malawi, Mozambique, and Zambia coming in to work there, while many of its locals moved into South Africa to work in the mines (Schachter 2009). In the past two decades, the economic and political meltdown in the country has led to increasing levels of out-migration to both neighboring countries and abroad. Crush, Chikanda and Tawodzera (2015) distinguished Zimbabwean out-migration in two racially distinct waves, namely whites who moved into South Africa immediately after the country's independence in 1980, and a growing number of black Zimbabweans who moved into South Africa since 1980. Tevera and Zinyama (2002) argued that since 1980, the country has seen large numbers of its citizens migrating to South Africa and Botswana to engage in small-scale trade, while many seek employment.

Pasura (2008) identified five overlapping phases of out-migration from Zimbabwe, beginning in the 1960s, as shown in Table 1.1. Table 1.1 also shows clearly that South Africa has remained a choice destination for Zimbabweans across all the five phases. Although the total numbers of Zimbabweans in South Africa are unknown, estimates put the numbers in the range between 2 to 3 million (Crush and Tevera 2010; Makina 2007). The UNDP (2010) estimated that at the end of 2009, the Zimbabwean population in South Africa was about 2.12 million people. In general, migration from Zimbabwe seems to have increased across the phases, possibly exacerbated by the end of apartheid in South Africa.

However, to date, no attempt has been made to assess and analyze the dispersion of Zimbabwean immigrant population South Africa over time or to explain the migration process with reference to theories of migration which have been put forward dating back to Ravenstein in 1885. The patterns of both the movement of Zimbabwean migrants and their distribution in South Africa, as well as the question whether these conform to the expected patterns as stated in theories, are not well documented.

Table 1.1: Zimbabwe's five phases of out-migration

Period	Nature of migrants	Approximate numbers of migrants	Major destination countries
Phase 1: 1960-1979	Political exiles and labour migration to South Africa.	210 000 + 75000	Zambia, Mozambique, Botswana, Britain, South Africa
Phase 2: 1972-1989	Flight of white Zimbabweans	142 000	South Africa, UK, Australia, Canada, New Zealand.
Phase 3: 1982-1987	Ndebele migration	5 000	South Africa, Botswana, Britain
Phase 4: 1990-1998	Migration of skilled professionals	200 000	South Africa, Botswana, UK, USA, and Australia
Phase 5: 1999-present	Mass exodus following the economic and political meltdown.	3-4 million	South Africa, UK, Botswana, Australia, USA, Canada, New Zealand, etc.

Source: Pasura (2008)

Most studies on migration in Southern Africa have focused on increments or adjustment of immigrants in cities, the growth of urban centers and problems associated with migrants to various metropolitan areas (Crush 2000, 2014; Makina 2013; Muzondidya 2010; Posel 2004). These studies do not consider the internal mobility of immigrants or their settlement patterns in the host country. Questions on their dispersion throughout the country, whether the migrants move on or remain at original destinations, have not been well addressed. Although the decision to migrate can be assumed to be economically motivated, no attempt has been made, with reference to Zimbabwean migrants, to identify the attributes of migrants moving into and within South Africa. There has been little or no research on the inter-provincial migration of immigrants in South Africa, hence, the motivation for this study. A specific question to this research is whether migrants disperse or concentrate in and around South Africa over time.

This study is important in the light of expanding numbers of immigrants in South Africa. Investigating migration flows to and within a host country in the sub-Saharan African context, specifically of Zimbabwean immigrants in South Africa, will aid in understanding migration patterns in the region at large. Furthermore, the ability to predict which areas of the host country will receive immigrants will aid in planning for the provision of services to local populations.

1.1 Objective

This study mainly aims to describe migration flows of the Zimbabwean-born population in South Africa over two periods as well as examine their internal migration patterns at both provincial and district level using modern analytic models. To achieve this aim, the study will:

- Assess the two datasets used, that is the 2011 Census and 2016 Community Survey for their reasonableness in addressing the migration question.
- Use the multiplicative component model to describe, analyze and compare origin-destination specific migration flows for the two datasets.
- Use a regression framework to identify attributes of migrants (internal movers vs non-movers) in South Africa.

In the process of these investigations, the study seeks to answer the following questions:

i. What can be learned from recent South African surveys about the movement of Zimbabwean immigrants in South Africa?
ii. Do Zimbabwean immigrants gradually disperse or concentrate in areas around the country?
iii. Does the internal mobility of Zimbabwean-born immigrants in South Africa vary with time?
iv. Are Zimbabwean migrants conforming to an expected pattern (for example, a stepwise pattern) in their movement?
v. Is migration from pioneer settlements selective? Who moves?
vi. Is there consistency in the migration patterns of Zimbabwean migrants in the 2011 Census and 2016 Community Survey?

1.2 Outline of the thesis

The thesis comprises five chapters. Chapter 2 reviews the theories of migration and migration studies conducted in Sub-Saharan Africa. The chapter also explicitly reviews the use of TODA models in several studies of migration flows. Chapter 3 presents the data sources used, assesses the quality of those data and describes the methods for modeling migration flows and propensities. The results from the models are analyzed and displayed accompanied by interpretations in Chapter 4. Chapter 5 concludes the thesis with a discussion of the results and a summary of the findings research. Areas of future work, as well as some reflection on the limitations of the study, will be discussed in this chapter.

2 LITERATURE REVIEW

This chapter reviews the 'laws' and theories of migration, the factors influencing migration, the analytical methods developed in migration studies to analyze migration flows and migration studies in Sub-Saharan Africa, particularly flow of Zimbabwean-born migrants to South Africa. The end of this chapter gives an insight into the 'gap' that still exists in the knowledge on migration flows in the region and explains the intended contribution of this research.

2.1 Migration theories: An overview

This section provides a review of the theoretical underpinnings of migration. Although much has been written, this review focuses on propositions which seek to answer specific questions and infer conclusions with regard to the volume of migration, the development of streams and counter-streams, and the characteristics of Zimbabwean migrants in South Africa.

2.1.1 Ravenstein's laws of migration

Migration is defined as the permanent or semi-permanent movement of individuals or group(s) of people from one geographic location to another (Lee 1966). One of the first attempts towards building a theoretical framework for understanding migration is the work of Ravenstein (1885). Ravenstein sought to describe the characteristics of migration based on empirical data, expressing these characteristics as 'laws of migration', summarized in the form of six empirical regularities which appeared to him to guide all migration movements.

First, Ravenstein (1885) hypothesized that migration declines with distance, such that the rate of migration between two points is inversely related to the distance between those points. The author observed that migrants who travel over long distances, usually go by preference to one of the great centers of trade and industry, while most migrants proceed only a short distance, and toward main centers of absorption. This idea was further developed into a gravity concept model by Zipf (1946). Zipf hypothesized that the volume of migration is proportional to the product of the sizes of the relevant origin and destination areas and inversely proportional to the distance between them. He viewed distance as a good proxy for costs of migration. The model is also linked to Lee (1966) study, which conceptualized migration as involving origins, destinations and the links between them in a 'pull-push' framework.

Although there is a general agreement that the basic distance (or gravity) model is a good tool for describing spatial interaction data, it has been criticized for its failure to incorporate the behavioral aspects of migration, the causes of migration and the migration decision-making process (Clark 1985). Stillwell (2005) argues that the 'measurement' of physical distance and its use as a major migration explanatory variable captures neither the social costs nor the time costs of moving, which might not necessarily be proportional to distance. Roy and Flood (1992) observed that a relatively small proportion of observed migration flows can be explained by the physical distance between origin and destination areas. These criticisms bolster Lee's argument that there are factors associated with an origin, a destination, intervening set of obstacles (for example, legal impediments to migration) and personal factors which influence the decision to migrate and the process of migration. Lee argued that potential migrants tend to consider several other factors which either hinder movement, push or attract them to a particular destination. He observes that the volume of migration in any given area varies directly with the degree of areal diversity, the diversity of people therein, economic conditions of the area and inversely with the difficulty of the prevailing costs and immigration restrictions. Following Lee, numerous modified versions of the gravity model have been proposed to try and improve the accuracy of the model (Greenwood 1969, 2005; Haynes and Fotheringham 1984). These variations of the gravity model are given a behavioral aspect by including additional variables relating to the origin and destination socio-demographic characteristics that are expected to influence migration significantly such as income, education, and age, among others.

Several studies have used modified gravity models to examine migration patterns. For example, Bouare (2001) examined the effect of GDP, unemployment, reported crimes and kinship on internal migration in South Africa. In this study, the author excluded the distance variable from the set of explanatory variables, resulting in the model ceasing to be a distance or gravity model. The exclusion of the distance variable was motivated by Denslow and Eaton (1984), who observed that the effect of distance on migration declines over time due to reduced transport costs and improved transportation and communication systems. Bouare's study showed that movement within South Africa was responsive to GDP per capita, unemployment, reported crime, and kinship. His results are consistent with those of Fan (2005), who estimated inter-provincial migration in China using a gravity type approach. She also examined the influence of economic disparity and other gravity variables including distance in

explaining migration. The findings of the study show that all the factors examined have a significant impact on migration flows. Most importantly, she noted that the effect of economic disparity increases with time while that of distance decreases with time. These results agree with the expected relationship.

Ravenstein's second 'law' is an early formulation of the theory of step-wise migration. It states that migrants gradually progress to centers of commerce and industry through multiple incremental and hierarchical stops in various intermediate locations. Ravenstein viewed step-wise migration in terms of distance and not necessarily in terms of areal ranking by population size.

The theory of step-wise migration has generated considerable theoretical argument and has been studied by many scholars. Riddell and Harvey (1972) modeled migration by steps through the urban system, in which individuals from a rural area move to a small town (assumed to be closer), then adjusts to the life there till they are ready to move to the next settlement. They conceptualize the movement of people towards urban areas as a learning process, occurring in steps to reduce uncertainties associated with migration and they noted that migration involves both relocations by stages and single-step movement. To some extent Afolayan (1985) confirms the step-wise pattern hypothesis both in terms of distance and population sizes of the places in Nigeria, but also observes additional patterns showing moves not necessarily in stages, indicating the influence of other factors such as whether married or not, occupation and age, on people's migration behaviour in line with Lee's more nuanced account of migration. Furthermore, Paul (2011) observed step-wise migration patterns in her study of Filipino domestic workers in Hong-Kong, the Philippines, and Singapore. She attributed this migration behaviour to high-cost barriers and immigration restrictions which prevent many migrants from realizing their preferred destination. These studies confirm the theory of step-wise migration, and in addition, they show that patterns of migration are not mutually exclusive but that some other forms can be found which include one-step and circulatory movement.

However, Riddell and Harvey (1972) point out that the empirical validation of step-wise migration processes is constrained by a lack of suitable migration data. Many attempts at measuring step-wise migration are presented as single-stage migration patterns, hiding other movement patterns. Conway (1980) argues that inconsistencies in validating step-wise migration occur due to lack of specification of scale at which the process operates and the absence of a robust operational definition for the process. He

concludes that examining step-wise migration as a process must primarily be based on lifetime migration histories of individuals who have documented actual places of residence.

Ravenstein's third 'law' was that each stream of migration produces a compensating counter-stream in the opposite direction, although not necessarily of the same volume. For example, he noted that although rural to urban migration may well dominate the overall stream of migration, there would always exist a counter-stream of urban to rural migration such that the 'net' migration between two points was always less than that of rural to urban migration, a point echoed by Lee (1966) who noted that migration tends to occur within well-defined streams and for every major stream there is a counter-stream. One reason for this, Lee argues, could be related to the disappearance of 'push' factors at the origin, hence the magnitude of the net stream is directly proportional to the number of push factors at the origin. Most importantly, Lee postulated that migration efficiency varies with economic conditions, being high where there are better economic conditions and vice versa, an argument further developed by Todaro (1976), who theorized that migration is stimulated primarily by rational economic considerations of relative economic costs and benefits.

The fourth 'law of migration' was that rural dwellers are more migratory than urban dwellers. Ravenstein observed that there existed different propensities to migrate between urban and rural residents; as a result, net internal migration streams normally have a rural-urban bias.

Ravenstein's fifth 'law' states that "Females appear to pre-dominate among short-journey migrants"(Ravenstein 1889: 288). He observed that most of the short-distance migrants were women whereas men comprised most long-distance migrants. He stated further that most migrants are adults with families, hence within their own region women are more migratory than men, but men are more migratory internationally, over long distances. In other words, he showed that migration is selective by certain socio-demographic characteristics, such as sex and age. Migration is assumed to be selective as persons respond differently to the sets of push and pull factors at the origin and at the destination. Furthermore, individuals possess different capacities and characteristics which enable them to respond to several forces of migration and perceive migration differently (Lee 1966). Thus, migrants are not a random sample of the origin area population but rather are self-selected as certain groups of the population may be more able to overcome obstacles to migration than others. Accordingly, this self-selection

differentiates the mobile from the non-mobile segment of the population (Shaw 1975). Tucker and Urton (1987) argue that migration is a selective process and they state that the mobility experience of any underlying population is not the same for everyone.

However, Connell, Dasgupta, Laishley *et al.* (1976) observe that, although little progress has been made toward building a general theory of migration selectivity, a considerable body of research on migration indicates that migrants are selected according to their demographic characteristics. In their respective studies, Feliciano (2005) and Rosenbaum (1993) argue that migrants are selected mainly by age, sex, education, occupation, marital status, and family size. This also led to a development of age-specific migration schedules by Rogers and Castro (1981), who found that even though migration levels vary markedly from area to area, age-specific migration distributions are quite similar over time and place.

Ravenstein's sixth 'law' states that migration increases with economic development. Ravenstein (1889) observed that an increase in the means of locomotion and a development of commerce lead to an increase in migration. He argued that there is a positive relationship between migration and technology, such that improvement in transport and communication networks and any expansion of trade and industry leads to increased migration. Most importantly, he noted that migration is mostly due to economic causes; hence a large volume of migration arises from the desire inherent in most people to better their lives. His observation of the predominance of the economic motive for migration is supported by Lee (1966), who states that migration efficiency is high where there are better economic conditions. Todaro (1980) extended this 'law' through his economic model, which emphasizes differentials in wages and employment conditions between areas, and on migration costs. He perceived migration as an individual decision to maximize income. In a detailed assessment of the Todaro model, Christensen (1994) argues that this model has provided an invaluable contribution to an understanding of migration in most third world countries.

Ravenstein's work, particularly his generalizations, formed the foundation of the first attempt to describe migration flows and patterns in terms of the socio-economic, demographic and geographic characteristics of migrants. Lee's conceptualization led to the development of an analytic framework for migration based on the laws, theories, and models of migration which prompted many other studies on the subject. Although these 'laws' and theories have been much quoted in several studies, they have also occasionally been challenged and criticized. Kubát (1976) describe Ravenstein's 'laws' as

merely observed regularities of human movements which cannot guide migration as a process, while Zelinsky (1971) describes Lee's framework as a set of 'loosely' related general empirical statements. Chang (1981) argues that Lee's 'push-pull' framework's failure to specify the functional relationships between different factors is a limit to its practical use as a model. However, at a fundamental level, the criticisms do not discredit the general validity of Ravenstein's observations. The basic 'laws of migration' remain intact, but have been systematized and expanded (Bilsborrow, Oberai and Standing 1984). The basic views of the 'laws' such as the economic motive in the migration decision, the negative effect of distance on migration, and the existence of step-wise migration are supported by empirical evidence. The treatment of gender differentials in migration and the inseparable relationship between migration and development have also been intensely studied.

In general, many scholars have described these propositions as most attractive and concise, which helped to advance migration studies from being descriptive to being inclusively analytical (Kosinski and Prothero 1975; Todaro 1976). The laws and theories form a conceptual framework for classifying factors influencing the migration decision. White and Woods (1980) acknowledge that Ravenstein's 'laws of migration' are simple and exceptionally reasonable about migration streams; hence they provide an important basis on which research on migration in the contemporary era can be undertaken. Chang (1981) and Oberai and Bilsborrow (1984) also note that Lee's push-pull framework is incorporated in many studies, particularly those dealing with migrant selectivity, and that quite a number of studies have been directly conceived within the framework of intervening factors. Overall, these propositions provide a general, non-rigorous schema for analyzing migration as a process forming a grand framework on which many scholars in the field of migration studies have based their work on.

2.2 Factors influencing migration

The decision to migrate is influenced by several factors which include different personal characteristics and a number of life-cycle considerations, among others. Lee (1966) describes the factors motivating people to migrate as those relating to origin and destination areas, intervening obstacles and socio-structural factors. These factors influence potential migrants to move from their place of origin or similarly to the place of destination. Many studies have characterized the factors influencing migration into a push-pull framework. For example,(Wallace 1998) distinguished five pull and two push factors that shape migration based on economic and sociological conditions. The

motives of potential migrants were assumed to be related to the following, pull factors: better living conditions, income, employment prospects, migration networks and individual freedom, and push factors: ethnic problems and economic conditions. This is in line with views of many scholars, that much migration is economically motivated (Adepoju 2006a; De Jong and Gardner 1981; Harris and Todaro 1970; Lee 1966; Todaro 1969, 1976; Wallace 1998). Although it is possible to directly measure the influence of each of these factors through a direct question to the migrant respondent on their reason for migrating, socio-structural characteristics of migrants can also provide an indirect explanation of the motivations to migration. Greenwood (1985) argues that these individual characteristics affect the odds of migration. Some of the characteristics greatly studied by migration researchers such as age, sex, education, marital status, and occupational status, are discussed below.

2.2.1 Age

The strongest influence on migration is age. Age changes in a regular and irreversible way over the life course of an individual such that migration intensities vary with age, as shown by Rogers and Castro (1981). Tobler (1995) argues that the regularity observed in the age structures of migration rates surely warrants designation as a law of migration. Most importantly, age differentials between movers and non-movers have been well documented (Rosenbaum 1993). For example, Shaw (1975) observed that younger groups in their late teens to early thirties are more migratory than their counter-parts beyond age 40. In another study, Castro and Rogers (1979) also observed that a larger fraction of migrants are young, with a peak at about age twenty-two, while young teens, adolescents, and adults are relatively less likely to migrate. To explain this, the authors state that younger people have relatively better labour market prospects in the destination area, they are prepared to take up work with low wages and are less constrained by families than older people. Bauer and Zimmermann (1999) state that young migrants have better returns for migrating than older migrants. They also highlight that older workers have a lower economic incentive to migrate. Furthermore, Massey, Arango, Hugo *et al.* (1993) note that it is highly likely that younger people have a strong feeling of relative deprivation due to dissatisfying conditions in the origin area and develop a greater motivation to move.

2.2.2 Sex

Sex differentials in migration have also formed a substantial portion of contemporary migration research, dating back to Ravenstein (1885) who argued that migration is sex-

selective as he observed a differential between males and females in their propensity to migrate. In the past, due to social norms, women were viewed as primary family caregivers with restricted access to economic opportunities hence they were less migratory than men. For example, Byerlee (1974), in his study on rural-urban migration in Africa, observed that rural-urban migration streams were predominantly male. Although it has been generally held that males are more likely to migrate than females, current research indicates that migration is less sex-selective than it used to be, particularly since, as societies develop, females become more economically active. Stone (1978) noted the support from recent research suggesting a reversal of trends, observed a decrease in male predominance in migration streams. Also, Caldwell (1969), in his study in Ghana, observed that the proportion of females in the rural-urban migration stream has increased, comprising almost half of all migrants, while Thadani and Todaro (1984) also observed that women present a growing proportion of rural-urban migrants in Africa. This reversal of trends and evening-out of sex differentials can be attributed to increasing education level and availability of better labour market opportunities for women. Krieger (2004) argues that this could also be linked to global economic restructuring that is the shifting of most cities from an industrial economic base to a service-sector economic base which increases economic opportunities for women.

2.2.3 Education level

Higher levels of education are expected to influence migration. Most studies of migration consistently show a positive association between education and migration (Feliciano 2005). DaVanzo (1978) observed that individuals with higher educational levels are more mobile than those with low education. This can be explained by the fact that higher education provides access to a variety of opportunities, both for employment and personal development; often though, people may need to migrate to take advantage of these opportunities in different areas. Education also equips individuals with the ability to make more successful cost-benefit calculations that are described by Todaro's theory of migration. However, most educated young people cannot cope with the high costs of moving and are constrained by immigration restrictions.

2.2.4 Employment status

Employed individuals are less likely to migrate from their current place of residence (origin) than the unemployed; hence unemployment influences migration (Krieger

2004). Unemployed people or persons in the informal sector are expected to be more mobile than the formally employed, which can be explained by unemployed people being less time-constrained for information search and preparation related to migration. However, unemployed individuals are constrained by a lack of access to information, especially those in rural areas.

2.2.5 Marital status

Marriage and the presence of family have a negative influence on migration. Family movement is limited by monetary and non-monetary costs of making a move and socio-economic ties to the community of residence; hence, it reduces the propensity to migrate. Also, migration decision making in marriage is a family matter which is more restrictive than for individuals who are single. Gubhaju and De Jong (2009) observed that never married individuals are more mobile than married individuals. Married women were significantly less likely to migrate compared to all other women (Posel 2004). This is most likely as women are viewed as primary caregivers in households and are perhaps restricted by social norms.

2.3 Techniques for measuring and modeling migration

2.3.1 Multiplicative component framework

Willekens (1994) distinguished three periods in the development of migration flow estimation methods. The first period saw the development of gravity models by Zipf (1946) preceding Wilson (1970)'s entropy maximizing models, which gave way to generalized and log-linear formulations of spatial interaction models by Willekens (1999). A major development in migration flow modeling came when spatial interaction data were viewed as cross-classified data, as contingency tables. This perspective resulted in the development of new methods involving the application of theory for the analysis of cross-classified data to describe and predict migration flows (Willekens 1999). In his work Willekens (1980) identifies the major tools for analyzing or modeling categorical count or flow data are logit and log-linear models. He demonstrates how spatial interaction models can be reformulated as logit and log-linear models belonging to a family of generalized linear models (GLMs). A formal equivalence exists between the log-linear model parameters, the parameters of the gravity model and the multipliers of the entropy maximization method (Good 1963; Willekens 1982). Alonso (1986) argue that the main advantage of the log-linear model is its explicit interpretation of the parameters and that its specification enables the evaluation of contribution made by

each set of information to the predicted flow. In general, the model clarifies and simplifies the estimation of spatial interaction flows.

The development of a log-linear modeling framework provided several techniques for analyzing and estimating migration flows within a system of regions (Little and Raymer 2013). One of the techniques which have become popular is the multiplicative component model. This model is analogous to the saturated log-linear model which has as many estimated parameters as data points. The multiplicative framework suggested by Rogers, Willekens, Little *et al.* (2002) has been shown to be useful in describing and summarizing migration patterns in a number of applications. It is this technique that this study uses in the analysis of Southern African migration flows.

The simplest multiplicative component model disaggregates migration flows into separate components: an overall, origin, destination and a two-way origin-destination interaction component. Extensions to the model include age as a further component, resulting in a model with two- and three-way interactions (Rogers, Willekens, Little *et al.* 2002). The overall component represents the level of migration, the origin component represents the relative 'pushes' from a region, the destination component represents the relative 'pulls' to a region; and a two-way origin-destination interaction component can be interpreted as the physical distance between areas not explained by the main and overall effects. The description and estimation of the model centers on the above components which are calculated with reference to the total level of migration rather than on the flows themselves (Raymer and Abel 2008).

Many studies have used this approach to analyze and estimate migration structures cross-classifying them by origin, destination and age (Raymer 2008; Raymer, Bonaguidi and Valentini 2006; Raymer and Rogers 2007; Rogers, Raymer and Willekens 2002; Rogers, Willekens, Little *et al.* 2002). For example, Raymer, Bonaguidi and Valentini (2006) applied the model to identify and compare age and spatial structures of migration over time in Italy for the period 1970-2001. Defining age and spatial structures as a set of multiplicative components, the authors identified stable and changing aspects underlying migration flows in the country. This included the evolution of recent patterns of age-specific interregional migration and a more concentrated labor force peak in the overall age profile of migration among other observations. In another study, Raymer and Abel (2008) analyzed international migration flows between 31 European countries for the period 2002-2005 using a multiplicative framework. The results of this study showed that migration within European countries steadily increased from 2.39

million to 2.67 million persons in the period. Although no patterns were observed, countries such as Germany and the United Kingdom were consistently the main receivers and senders of migrants.

Perhaps the recent detailed work on estimating and analyzing migration flows using the multiplicative component approach has been carried out in South Africa by Dorrington and Moultrie (2009) and Moultrie, Dorrington and Budlender (2016). In the earlier paper, Dorrington and Moultrie (2009) applied the method to analyze and describe migration using data from the 1996 and 2001 South African Censuses as well as the 2007 Community Survey. Focusing on inter-provincial migration by the province of origin, destination, age, sex, and population group, the authors identified consistent patterns of migration over the 15-year period. These included very little change in the age-patterns of overall internal migration, with a very small difference between males and female migration patterns over the period. They also observed that the proportion of female migrants has been increasing over the period, such that the difference between males and females in the overall magnitude was very small. These observations were consistent for all the four population groups. The major sending provinces were Eastern Cape, Gauteng and Limpopo while the main receiving provinces were Gauteng and the Western Cape.

Later, Moultrie, Dorrington and Budlender (2016) applied the multiplicative component framework to the 2011 Census data and produced results largely consistent with those found in the earlier study. In addition to the patterns of migration, the authors state that most migration in South Africa is concentrated in the major employment age range.

In general, these studies have shown that this method is a useful tool for identifying, describing and analyzing migration structures including for developing countries. Raymer and Abel (2008) argue that this method is useful in estimating migration as it makes a distinction between an overall, main, and interaction effects in migration tables with parameters that can be used to guide the estimation process. This, in turn, makes it easy to model the underlying structures of migration flows through each multiplicative component, allowing better identification of errors in reported data. This method is described in full in the next chapter, as well as the data used in this study.

2.4 Migration trends in sub-Saharan Africa

Several systematic reviews of migration in sub-Sahara Africa (SSA) have been conducted, focusing mainly on its nature, characteristics and current trends. The major characteristic trends in migration in the region include the dominance of labour-related migration flows; the increase in relative female migration; the increase in the rural-urban migration flows; and the rise in family compared to individual movement. Russell (1993) observe that labour migration has been the major type of movement in sub-Saharan Africa and includes both individual and family movements. In support, Adepoju (2000) argues that the dominant labour migration flows in the region are a result of the usual movement from poorer to wealthier regions, largely following specific streams towards economically stronger centers, for example, migration from Eastern and Southern African countries to South Africa. Present-day migration streams in SSA; include labour migration to both international and internal destinations (Mafukidze 2006). Due to better economies, countries such as South Africa and Cote d' Ivoire continue to attract migrants from countries who themselves are in the middle of political and economic turmoil (Gonzalez-Garcia, Hitaj, Mlachila *et al.* 2016).

However, other studies, such as by Bloch (2008) and Crush, Williams and Peberdy (2005), argue that, although the bulk of the migrants throughout the continent are labour migrants, a certain fraction of movers are forced migrants due to political and civil strife in some countries, which remains a challenge on the African continent. Therefore, while some individuals migrate simply to earn a better living or maximize expected earnings, others flee complex emergencies such as violence and poverty.

Adepoju (2006b) observed that many people who migrate within the region, especially labour migrants, tend to explore a much wider set of destinations, resulting in rising levels of both temporary and long-term circulation. This is probably a result of the quest to find the most preferred destination with the desired or expected return which might involve multiple-stops. This is in line with Russell (1993), who earlier highlighted that migration in SSA is largely temporary and oscillatory; and is still dominated by international migration for employment. In general, migration in this region is mostly an intra-regional phenomenon, essentially in the form of circulation, and most destinations of its migration flows are areas or countries with relatively improved and more diversified economies (Adepoju 2006a).

The other major characteristic trend in migration in SSA observed by Oucho and Gould (1993) and Adepoju (2000) is that the proportion of women in the migration streams across the region is increasing. They noted the traditional pattern of male-

dominated, long-term and long-distance migration is increasingly 'feminizing' which could possibly be explained by an increase in family migration. This is explained by Adepoju (2000), who argues that migration in SSA has remained a 'family matter' as opposed to an individual issue to such an extent that even non-migrant members of the family are intimately involved in and affected by the migration process. The migrant members move in search of employment or other economic opportunities and they maintain strong personal links with family left behind, and possibly return home regularly or send remittances. In other instances, the family, with time, migrate to unite with their long-term fellow migrant member. This is also supported by the view on migration in Southern Africa of Crush, Williams and Peberdy (2005) that migration in the region is deeply gendered, with women constituting an increasing proportion of the migrant flow with significant proportions of females migrating independently to fulfill their own economic needs, inclusive of those reuniting with their husbands or other family members. For example, Russell (1993) observe that the female-migrant labour force in Southern Africa is growing faster than the male-migrant labour force (3.0 versus 2.6 per cent per year), showing evidence of growing migration for employment among women, linked to rising levels of female education, the elimination of legal restrictions on female migration, and changing norms in traditional societies.

Another important component of the demography of sub-Saharan Africa is internal migration, which has seen the region experiencing significant levels of urbanization regardless of slow development (Adepoju 2006a; Oucho and Gould 1993). The increase in the proportion of the population living in urban areas in SSA can best be explained by the Todaro framework which states that an increasing level of rural-urban migration shows an increasing anticipation for a better living for those who move. This movement could also be driven by factors such as poor access to social services, lack of employment opportunities among other factors could possibly be pushing migrants from rural-to-urban areas. However, urban-rural and urban-urban migration is the least common in the region (Oucho and Gould 1993).

Furthermore, Mafukidze (2006) also note that, although the bulk of migrants tend to be young adults who have a higher level of educational attainment than those who do not migrate, there is a growing migration stream in the region which often brings the less educated, as well as women and children. This has led to a slight shift from labour migration in the region to commercial migration, with most people engaging in self-employment rather than paid labour. Finally, it is important to note that

characteristically dominant labour migration flows, refugee flows and all forms of migration are changing dynamically with the emergence of some current trends that include feminization of migration, diversification of migration destinations among others.

2.4.1 Migration in Southern Africa: Recent trends

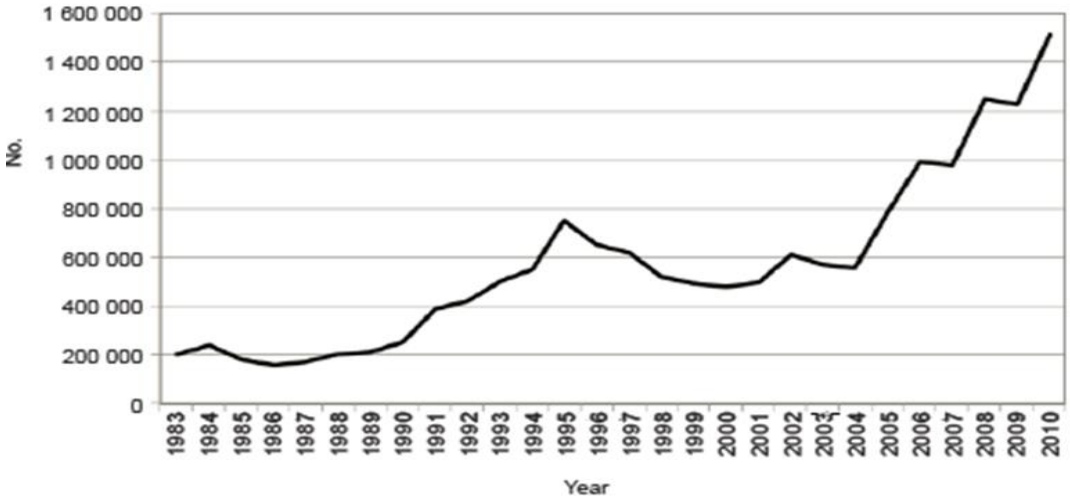
This subsection reviews studies on the migration of Zimbabweans to South Africa. Migration in Southern Africa primarily flows between individual member states which are divided into sending (Mozambique, Malawi, Lesotho, Zimbabwe) and receiving (South Africa, Namibia) countries, while some countries (for example, South Africa) fall into both categories (Crush, Williams and Peberdy 2005). Oucho (2006) argues that the current patterns of international migration in the sub-region have two features, namely, major cross-border migration between Southern African countries and inflows from outside the sub-region.

Since the beginning of the mining industry in South Africa in the mid-nineteenth century, the country has been the major destination of most migration flows from Southern African countries (Crush, Williams and Peberdy 2005; Oucho 2006). Polzer (2009) observed that most migrants moving to South Africa are Africans from all over the continent, but especially from within the sub-region. He argued that migrant flows from neighboring countries to South Africa continue to increase and recent trends show that Zimbabwe has become a major source of migrants into the country. Muzondidya (2008) agrees, pointing out that among other destinations, South Africa is the largest and by far most important destination for both skilled and unskilled Zimbabweans. This is reflected in the main migration corridors: from Zimbabwe to South Africa, possibly because of South Africa's proximity and broad economic base in the region (Gonzalez-Garcia, Hitaj, Mlachila *et al.* 2016). In general, literature reflects that of late, there has been a large increase in migration flows from Zimbabwe to regional countries, particularly South Africa, in response to the dire political and economic situation in the country.

A substantial amount of research has considered the aggregate population migration of Zimbabweans to South Africa, with most of the earlier research focusing on questions about labour migration, gender balance and drivers of migration into South Africa. Crush, Chikanda and Tawodzera (2015) used the data from the SAMP

(South African Migration Project)[1] surveys to assess the patterns of migration from Zimbabwe to South Africa over time, both in volume and its shifting nature. They observe that the nature of migration between these two countries is undergoing a significant shift and the observed trends are likely to continue and intensify. The authors estimate that the number of Zimbabwean migrants began to increase from 500 000 in the 2000s to more than 1 million in 2005, as shown in Figure 2.1, derived from Statistics South Africa data.

Figure 2.1: Stocks of legal in-migrants from Zimbabwe to South Africa, 1983-2010



Source: Crush, Chikanda and Tawodzera (2015)

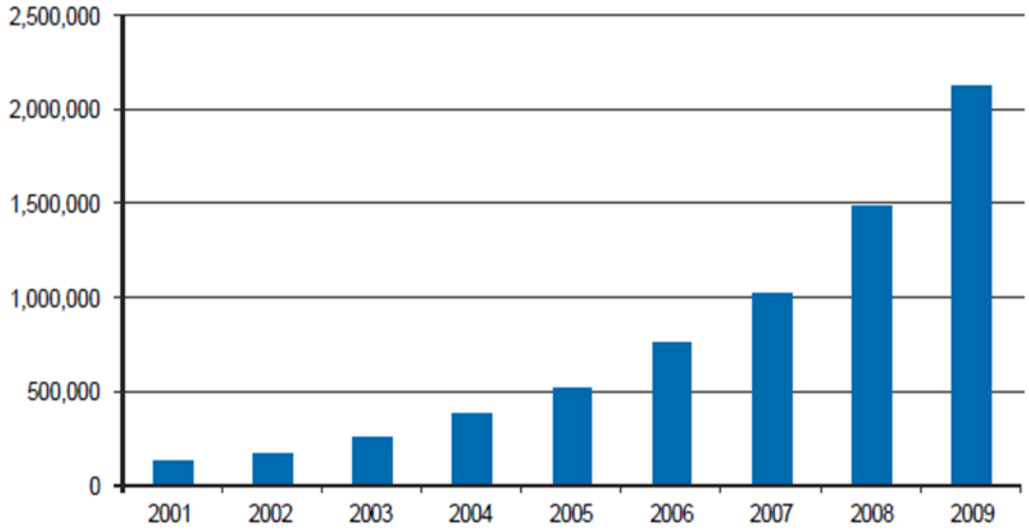
Figure 2.1 shows that migration from Zimbabwe to South Africa is increasing, which is consistent with findings from Landau (2007), that Zimbabweans have been steadily entering South Africa via multiple routes rather than through a single border post, leading to increasing numbers of undocumented migrants into South Africa. Makina (2008) used data sets from a pilot study of 4654[2] Zimbabwean migrants in Johannesburg and estimated that there are between 800 000 and one million Zimbabweans in South Africa. In another study, Makina (2012) argue that South Africa has experienced unprecedented migration from Zimbabwe. The author used datasets from surveys and estimates that by the end of 2007 the number of Zimbabweans in South Africa ranged from 1 million to 2 million, all migrating as a result of the political and economic crisis in that country. Figure 2.2 shows that according to UNDP (2010)

[1] The findings were based on a survey conducted in Johannesburg and Cape Town in late 2010, which excluded some important groups of migrants working on farms or living in other small towns.

[2] Estimates based on datasets from this sample should be treated with caution; the sampling frame and sampling techniques used create a significant potential margin for error.

by 2007 there were over 1 million Zimbabwean-born migrants in South Africa. These estimates were obtained by extrapolating from the data sets of a survey of over 4 000 Zimbabwean migrants in Johannesburg (Makina 2007), taking into account renewed migration flows.

Figure 2.2: Trend of the Zimbabwean-born population in South Africa



Source: UNDP (2010)

A likely estimate as at 2008, based on a range of data sources, was around one million Zimbabweans living in South Africa (Polzer 2008). However, the above-mentioned estimates vary and the range of each set of estimates seems too high, for example, while UNDP (2010) estimates show a smooth steady increase in the numbers of Zimbabweans living in South Africa, Crush, Chikanda and Tawodzera (2015) show a rather different picture, less smooth trend in estimates with fluctuations over time. Although these calculations are based on more solid evidence, sample sizes, frame, and techniques used, subject the estimates to errors. These numerous attempts reflect the difficulty to quantify and come up with the exact numbers of Zimbabweans in South Africa at any given time. Most of this difficulty emanates from the fact that some migrants would have taken South African nationality and hence are not easily identified (Bloch 2006). Also, language similarities, (for example, most Zimbabweans from the Southern parts of the country identify themselves as locals) pose a difficulty in identification. Lastly, the author states that the large pool of the unquantifiable number is undocumented migrants who are also not easy to identify. The counter-argument to this would be that the government of South Africa introduced a special registration of all Zimbabweans in the country through the Dispensation for Zimbabweans Project

(DZP) which saw many migrants documented, issued with special permits from 2010 to regularize their stay. However, the quick influx of Zimbabweans which continued even after 2010 might mean more new migrants remain undocumented.

The defining characteristic of Zimbabwean-born migrants in South Africa is circular movement mostly temporarily and usually repetitively moving between home and host regions, typically for employment and trade (Bloch 2008; Crush and Tevera 2010; Makina 2008). A recent study by Crush, Chikanda and Tawodzera (2015), using the third wave of data from the 2010 survey conducted by SAMP, observed that although circular migration is still very common, most migrants increasingly viewed residence in South Africa as less of a quick fix but rather a long-term destination. The authors argue that the circular migration defining characteristic is changing dramatically, with most migrants currently staying longer in South Africa. Kiwanuka and Monson (2009) suggest that this change could be because migration emerged for many as the only solution to the dire situation in Zimbabwe and hence they choose to settle in the host country.

One of the major issues of concern about Zimbabwean migrants is the gender balance of the migration profile. In the past, when there was demand for foreign labour on the mines the migration stream from Zimbabwe to South Africa was dominated by males, with most females being temporary migrants either visiting, for trade or seeking medical services. However, more recently there has been a shift in the gender profiles of this migration over time. Dodson (2000) used the SAMP mid-1997 survey to assess the gender make-up of the migrants in South Africa. The author observed that male and females migrate for different reasons, with men primarily for employment and women to re-unite with their spouses and/or informal trade. However, she argued that, in addition to a long-established tradition of male labour migration, there is a growing stream of female migrants moving into South Africa. In support, Makina (2007), using a pilot study, showed that although migration of Zimbabweans to South Africa had increased, females constituted 41 per cent of total migrants while 59 per cent were males, and argued that the gender makeup of the migration increasingly reflected family migration as opposed to earlier when one individual (the breadwinner) would migrate to fend for the family. In the study by Crush, Chikanda and Tawodzera (2015), 44 per cent of migrants were females while 56 per cent were males. The authors argue that the proportion of female migrants is continuously rising, and their findings are consistent with the two preceding studies mentioned. The general view of these findings is that

many more women are moving to South Africa on their own, or with their children, and no longer only partnering men, but arriving as individual long-term migrants (Landau 2007).

Another striking finding is that the bulk of migrants from Zimbabwe to South Africa do not necessarily go straight to their final destination, but go through a series of stops prior to arriving at their desired destination, for example, starting in other towns/provinces before moving to Cape Town or Johannesburg (Crush 2014; Crush, Chikanda and Tawodzera 2015). Consequently, there are increasingly visible concentrations in Gauteng province and other major urban centers strongly facilitated by social networks (kinship and friendship ties) which are also increasing. In general, Polzer (2008) observe that Zimbabweans are neither concentrated in one part of the country nor dispersed evenly across it.

Furthermore, the bulk of Zimbabwean migrants to South Africa are the economically active age group between 21 and 40 years (Makina 2008), shown by the relative growth in the proportion of unmarried migrants and the continued increase in the proportion of working-age migrants.

As this selective review has shown, several studies have enhanced available knowledge of international migration of Zimbabweans to South Africa. Although there have been findings on the level, direction and the changing nature of migration, the widespread nature and wide ranges of stock estimates are concerning, showing the level of speculation around the number of Zimbabweans in South Africa. However, the overwhelming findings on the characteristic nature of this migration stream are highly credible. These include the continuation of the feminization of migration, its step-wise nature and the fact that migration is concentrated in the economically active ages. Recent work by Crush, Chikanda and Tawodzera (2015) confirms most of these findings and provides a basic assessment of the nature of this migration stream. However, gaps still exist in the current knowledge about population migration from Zimbabwe to South Africa. First, most of the work reported earlier has been based on small sample surveys (for example, SAMP waves of surveys) to extrapolate and make inferences about the level and nature of the migration stream. The major concern is that these surveys are conducted in either one or two cities in South Africa but are used to infer for the whole body of Zimbabwean-born migrants in South Africa. Second, none of these studies have attempted to use large sample surveys such as censuses and Community Surveys to unpack both international and internal movement patterns of

Zimbabwean-born migrants. The internal distribution or concentration of these migrants, mobility patterns and, socio-economic and demographic characteristics of internal movers as opposed non-movers have not been explored, neither has the consistency of patterns from the migration question across surveys been evaluated.

This work attempts to describe, analyze and compare migration flows over two five-year periods as well as explore in detail the internal migration patterns, aggregate level differences in migration propensities of migrants and unpack some of the characteristic features present. It also aims to offer insights into the internal population (migrants) movement in South Africa that have not been explored and finally reconcile findings from both the census and the Community Survey. This is achieved by examining migration at both provincial and district level using the multiplicative component model, the logistic regression model, and descriptive statistics.

3 DATA AND METHODS

This chapter describes the data sources and the various methods used to model migration using cross-sectional data. Section 3.1 introduces the data and assesses the quality of data, particularly migration data on Zimbabweans in South Africa. Section 3.1.3 compares the two South African data sources used, the 2011 Census and 2016 Community Survey for consistency. Section 3.2 presents the multiplicative component model used to describe and analyze origin-destination migration flows. Finally, section 3.3 describes the logistic regression model used to identify characteristics of internal migration of Zimbabweans in South Africa.

3.1 Description of the datasets

Rogers, Willekens and Raymer (2001) distinguish two types of data frequently used in studies of migration, namely, movement data, and transition data. Movement data represent the number of events (migrations) during a given interval length while transition data represents the number of individuals (migrants) by place of residence at two points in time: prior to or at the time of census or survey. The data used in this study are transition data which give information on the number of surviving migrants by country of birth, place of previous and usual residence, age and sex from two sources, the 2011 Census and 2016 Community Survey for South Africa. These data can be downloaded from the Stats SA website[3]. To apply modern analytic models to analyze and describe the migration of Zimbabweans to and within South Africa, data on the Zimbabwean-born foreign nationals from 2011 Census and 2016 Community Survey were extracted.

3.1.1 The 2011 Census

The 2011 Census is the third post-apartheid census to be held in South Africa following the 1996 and 2001 Censuses. The reference date for the census was midnight 9/10 October 2011 and data collection was carried out until 31 October. The census was designed to collect data on various demographic and socio-economic variables which include among others, education, migration, fertility, mortality and labour force participation. The units of analysis for the 2011 Census, which has a national coverage are households and individuals. Censuses seek to achieve national coverage and are thus

[3] http://interactive.statssa.gov.za:8282/webview/

representative of the national population, which to some extent aids migration analysis since the sample size allows analysis not only at national level but also at provincial and down to municipal level. However, census data can be problematic, especially for migrants below provincial level, depending on the design and methodology of the Post-Enumeration Survey (PES) as discussed in the next section.

Data from the census for this study are in the form of a 10 per cent unit level sample drawn as follows: 10 per cent sample of households in housing units and all individuals living in them, plus a 10 per cent sample of individuals living in collective living quarters and a sample consisting of all persons in the households and collective living quarters. The 10 per cent sample of the data includes a weighting variable designed to correct for the realization of the sample and for scaling up to national whole based on a systematic sample of households, stratified by province and district council. The 2011 Census estimated a significant proportion of international migrants, collectively accounting for 3.8 per cent of the country's population of 51.7 million after adjusting for undercount.

In order to measure both internal and international migration, questions on country of birth, citizenship, year moved (if the person moved more than once, then the year of the most recent move is recorded), provinces of previous and of usual residence were asked from the census (Stats SA 2015). The census does not measure emigration, the legal status of migrants and does not pick multiple entries as it only asks migrants about their last move into the host country. The legal status of migrants poses problems in census data, illegal status hinders immigrant integration hence migrants feel more like outsiders bound with insecurity while anti-migrant sentiments lead to stereotyping and discrimination. These factors suppress participation of migrants in censuses and produce high levels of non-response as migrants feel insecure and fear victimization which has a negative effect on the plausibility of migration data.

The 2011 census results show that 75.3 per cent of international migrants came from Africa, and of these, 68 per cent came from the SADC region. Of these, 60.8 per cent came from Zimbabwe, the country of birth of the highest proportion of migrants into South Africa (Stats SA 2015). According to the census, the population of Zimbabwean-born nationals accounts for about a third of the total foreign-born nationals in South Africa.

3.1.1.1 Post-Enumeration Survey

A Post-Enumeration Survey (PES) is an independent survey that replicates key aspects of the census in a small sample of enumeration areas (EAs) to provide a statistical basis for estimating the extent of coverage and for adjusting the census. In order to evaluate the coverage and content errors in the 2011 census, a PES was conducted by Stats SA following the census. The PES is carried based on the assumption that both the census and the PES are independent. Sample design involved selecting primary sampling units in areas whose boundaries correspond to those of census areas to allow for easy comparison[4] between the PES and the census.

The 2011 PES estimated the total number of persons and households in dwelling units on the census night, particularly persons who spent the census night in these living quarters. Estimates of cases from both the PES and the 2011 census are compared to provide an estimate of cases in PES and not in the census, and vice versa, allowing computation of persons missed from both data sources. The main variables used for matching of persons are their date of birth, age, sex, population group as well as the relationship to head of household and marital status.

600 EAs were selected (from a total of 103576) and proportionally allocated to the nine South African provinces namely: Gauteng (GP), Eastern Cape (EC), Northern Cape (NC), Limpopo (LP), KwaZulu-Natal (KZN), North-West (NW), Western Cape (WC), Mpumalanga (MP) and Free State (FS) based on the 2001 PES standard errors. The PES estimated the total population of South Africa in 2011 to be 40.62 million while the census estimated 42.08 million. After matching, the total of persons omitted from both data sources was estimated at 9.17 million, then the total adjusted census count was 49.98 million. The total population of South Africa in 2011 was finally estimated at 51.8 million persons, obtained by adding to the census, 1.79[5] million persons in the out-of-scope EA types to the adjusted census count. The overall response rate for the PES was 94.8 per cent, which is well above the minimum required threshold of 80 per cent as set by Statistics South Africa. Across all provinces, the response rates were also well above the minimum acceptable criteria. The PES, together with the detailed matching of records with the main census, indicated that the undercount in the census was 14.6 per cent (Stats SA 2012), and varied by province (from 10 per cent in Limpopo to 18.5 per cent in the Western Cape). The extent to

[4] This is the main reason why primary sampling units for PES were selected from census enumeration area(s) EAs.

[5] These cases were excluded in the PES

which the population was undercounted was estimated from the results of the PES using established statistical techniques. The final population estimates were then adjusted by these estimates of the undercount.

However, there is some statistical uncertainty about the estimate of the extent of the undercount because the estimates were derived from a relatively small (PES) sample. This directly impacts on how well this sample represents the true estimate of the size of the population hence uncertainty around the actual number of people in the country on census night. This uncertainty extends from individual counts to estimates of any subgroups of the population which has a direct impact on the actual migrants in the country on census night.

3.1.2 The 2016 Community Survey

The 2016 Community Survey (CS) is the second intercensal survey undertaken by Statistics South Africa following one conducted in 2007. The survey reference date was midnight of 6/7 March 2016. The aim of the survey was to provide population and household statistics at the municipal level to support government planning and decision-making while giving municipalities concrete data on the demographics and socio-economic situation within their boundaries (Stats SA 2016a). The survey is one of the main sources that provide demographic information which includes population estimates as well as household characteristics. Most importantly the 2016 CS provides the latest evidence on the levels and differentials regarding fertility, mortality, and migration and provides data at municipal level although it is constrained by sample size and weighting issues. Small sample size increase variance of statistical estimates from each dwelling unit (DU), which increases the uncertainty of numbers estimated. The 2016 CS employed a single-stage sample using the 2011 Census Enumeration Areas as a sampling frame with sample numbers of households derived in proportion to the number in the 2011 Census. The sample design is not self-weighting at the national level and sample weights are used to adjust the responses collected to represent the underlying sample frame. The survey covered 1.37 million dwelling units from all provinces, enumerating 3.22 million persons. The questions asked in the survey were similar to those asked in the 2011 census. In addition, the survey also asked the respondents the main (reason) for moving to a current place of residence as well as emigration questions.

The overall response rate in the survey was 90.5 per cent, and across most provinces except Western Cape, the response rates were all above the minimum

threshold as stipulated by Statistics South Africa. A total population of 55.6 million persons was estimated in 2016. This estimate was obtained through reweighting of the CS based on the sample design. Design weights for both sampled and additional dwelling units (DUs) in sampled EUs were generated and adjusted using both the synthetic adjustment factor to account for excluded DUs and the non-response adjustment factor. The adjusted design weights were calibrated such that respective aggregate totals matched the control totals (based on the projected 2015 mid-year population independently derived by Stats SA using demographic models[6]) population distribution across all key demographic variables at national, provincial and municipal levels to construct sample weights at a person and household level.

The population increased by about 7.5 per cent from the total population in the 2011 Census; 2.8 per cent of this total population were foreign-born nationals. The survey results showed that 85.6 per cent of international migrants came from Africa and of these, 76.9 per cent were from the SADC region and of these, 55.5 per cent were Zimbabwean-born. These results confirm that Zimbabwe remains the largest migrant-sending nation into South Africa. However, there is a significant gap between the two estimates in numbers of the foreign-born and/or Zimbabwean-born population from both the 2011 Census and 2016 CS and these are investigated in detail in the subsequent section.

3.1.3 Comparison of the 2011 Census and 2016 Community Survey

In regard to Stats SA (2016b) estimates, the estimate of migration from both the 2011 Census and 2016 CS differ significantly showing a decline of the total foreign-born persons in South Africa, from 2.1 million (3.8 per cent of the total population) to 1.5 million (2.8 per cent) respectively (Table 3.1). The decline extends to the Zimbabwean-born population which declined, by over 100 000 migrants between the two datasets, although it remains the largest migrant group, comprising a third of the foreign-born population in South Africa. The magnitude of the decline in the overall foreign-born population between the two data collection periods is questionable. It implies that more migrants left the country and that there was no re-entry, or any new entries in the period, which is unlikely. Therefore, these observations demonstrate that the two data-sources essentially cannot exist together in the equivalent logical space meaning the information in one or both is not correct, regardless of whether the underlying patterns are the same.

[6] Not all the mortality, fertility and migration assumptions that go into the model are known.

In any case, for the purposes of this study, if the patterns are consistent then the methods will still be applicable.

Table 3.1: Census and Community Survey estimates

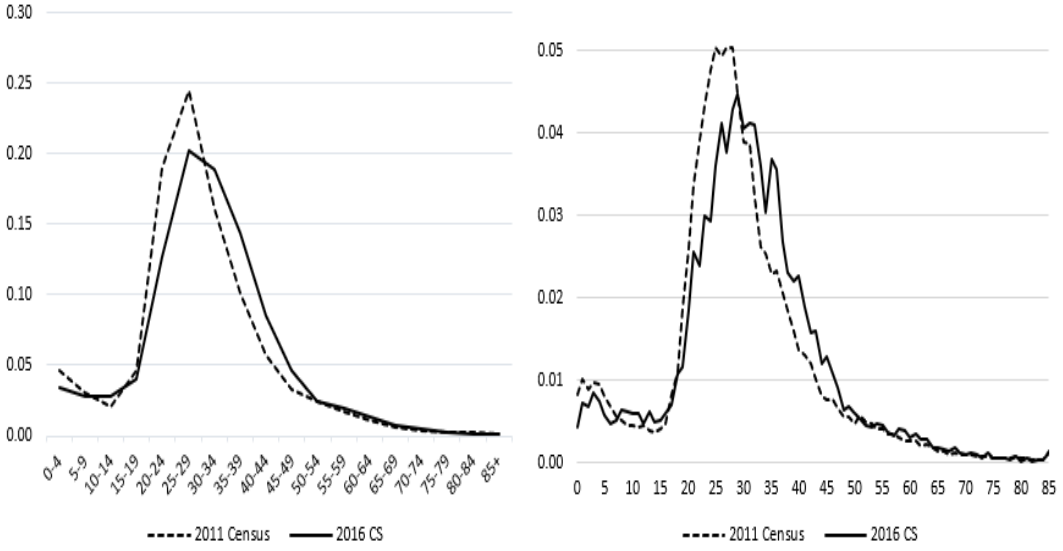
Data Source	ZW-born population Unweighted	ZW-born population Weighted	Total foreign-born	ZW-born migrants as % of all foreign-born	Total Population (ZA)
2011 Census	55 043	674 056	2 168 395	31.1	51 770 560
2016 CS	29 725	574 047	1 573 331	36.5	55 653 654

Source: Derived from Statistics South Africa reports (2011 and 2016)

3.1.3.1 Zimbabwean-born population distribution by age

Age profiles of migrants either by single or five-year age groups should exhibit certain regularities consistent with the migration schedule designed by Rogers and Castro (1981). Figure 3.1 shows the age distribution of migrants from the 2011 Census and the 2016 CS. For both datasets, the working age (20-45) proportion is significantly higher than the pre-labour force and old-age migration proportions. Clearly, the age distributions show regular features such as a peak in the young adult ages and declining migration propensities with increase in age hence the above age-specific migration pattern conforms to the Rogers and Castro schedules.

Figure 3.1: Overall age profile of the proportion of Zimbabwean-born population

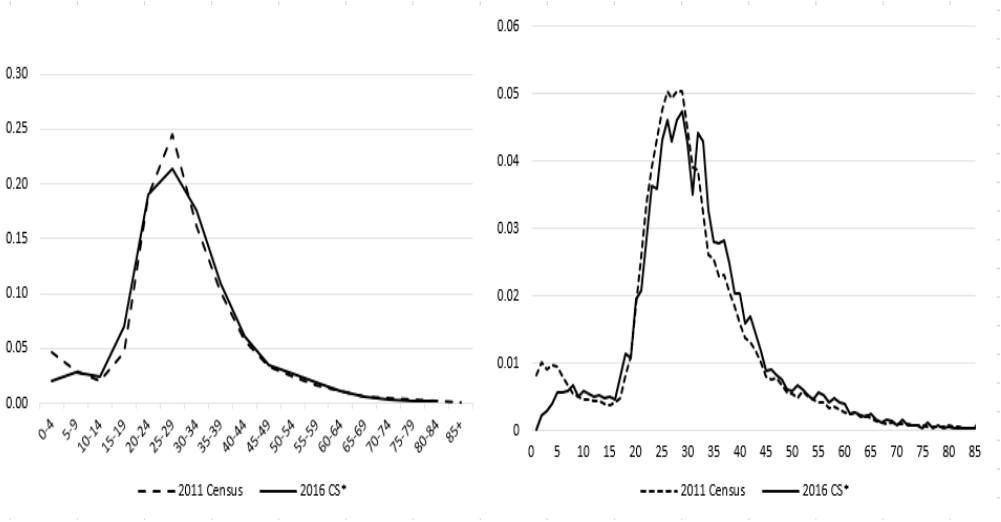


In general, the two datasets are strongly congruent in shape, although not in level. It is interesting that there is a generalized right-shift in the data for 2016. This means migrants may have aged in the last five years without a balancing entry of new migrants though unlikely. Figure 3.2 shows the age distribution of all migrants who arrived in South Africa on or before 2011, extracted from both datasets. As expected, the results

confirm the above observations, the age pattern of migrants is highly consistent showing regular features. It is also apparent from Figure 3.2 that the 2016 CS underestimated child migrants aged 0-4 in 2011. The 2016 single age distribution is rough compared to 2011. These observations could be a result of sampling errors and underreporting from respondents or enumerator training deficiencies in the 2016 Community Survey.

Of greater concern, however, is that the numbers of Zimbabwean-born migrants in 2016 have declined by about 14 per cent from those recorded in the 2011 Census. The proportion of migrants age 25 years and above in 2011 declined in 2016, which could possibly contribute to the difference in numbers recorded. Other natural events such as death and emigration[7] over the 5-year period could be possible factors.

Figure 3.2: Age profile of Zimbabwean-born migrants as at 2011 census from 2011 Census and 2016 CS



3.1.3.2 Migration and sex

Sex has been recognized as important to understanding migration processes especially in sub-Sahara Africa, thus including the variable in migration studies is essential to the study of migration patterns. Adepoju (2006b) noted that migration in sub-Saharan Africa is dynamic and extremely complex, reflected in several current trends which include the feminization of migration and diversification of migration destinations. Table 3.2 shows very little difference by sex in overall percentage magnitude. The

[7] Statistics South Africa 2016 show that most emigrants who left the country between 2011 and 2016 were aged 25-29 years and older and left South Africa between 2011 and 2015, with the highest proportion leaving in 2015. The highest proportion of emigrants moved to Mozambique at 17,7 per cent, followed by Zimbabwe (most probably Zimbabwean-born) and Australia at 17.1 per cent and 12.5 per cent respectively.

reported figures by sex from 2016 are less than those in the 2011 Census, which could be due to issues of relative sample size or that the 2016 CS estimates are wrong.

Table 3.2: Distribution of Zimbabwean-born population by sex

Data source	Male		Female		% Male	% Female
	unweighted	weighted	unweighted	weighted		
2011 Census	30 870	382 840	24 173	291 216	56.8	43.2
2016 CS	15 900	316 495	13 825	257 552	55.1	44.9

Source: Derived from Statistics South Africa reports (2011 and 2016)

The significant feature of the gendered migration of Zimbabweans to South Africa is that it is slightly male dominated. However, the proportion of females generally seem to have increased between 2011 and 2016. The results are consistent with the law of migration postulated by Ravenstein (1889) that over long distances males are more migratory than females.

Figure 3.3: Proportion of Zimbabwean-born population by sex, 2011 Census and 2016 CS

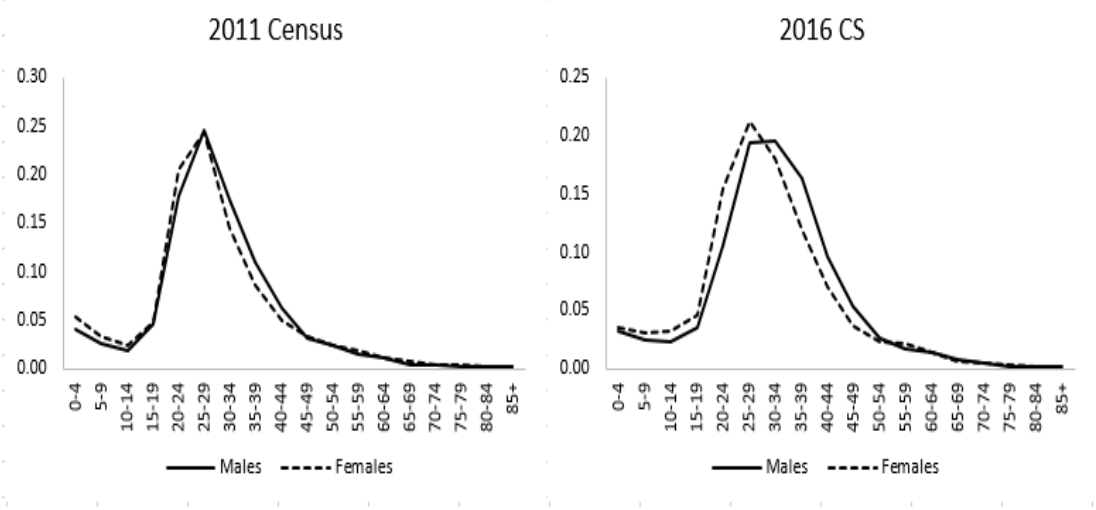


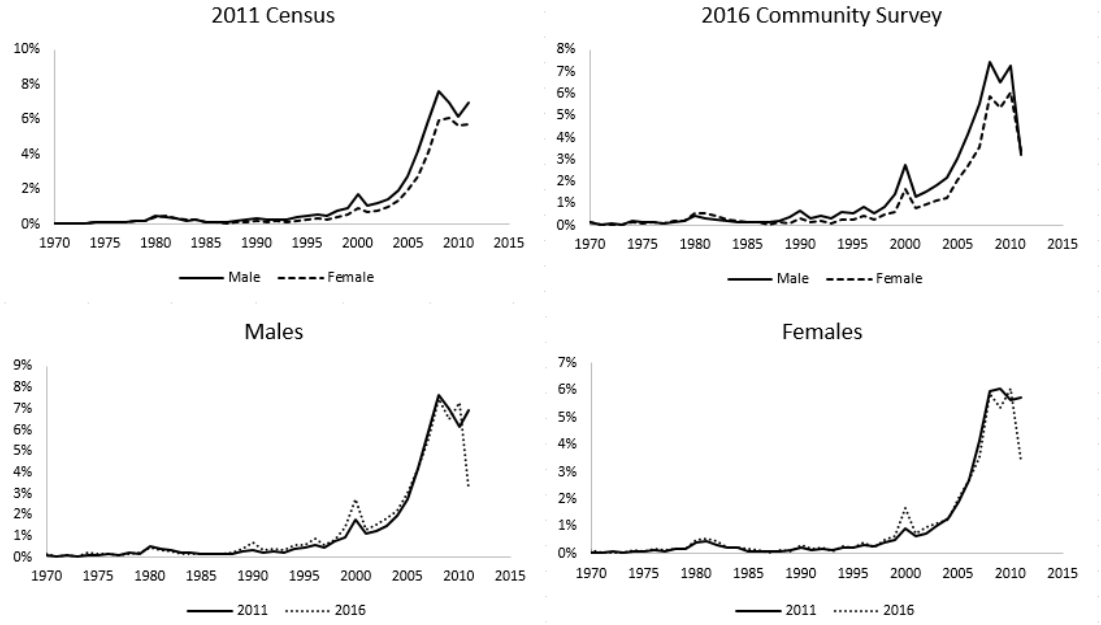
Figure 3.3 shows the age-sex distribution of the Zimbabwean-born population from both the 2011 Census and 2016 CS. The age-pattern for both males and females conform to the Rogers and Castro regular schedule for both surveys[8] showing a right-skewed unimodal curve, with the peak mostly at age 25-29. The age-distribution of males is slightly to the right of that for females showing that Zimbabwean-born male population is slightly older than that of females and this pattern is consistent for both surveys. Males proportionally dominate females at ages 25-59. The pattern by age and sex is reasonably similar for both surveys.

[8] Strictly speaking a census is significantly different from a survey but for convenience sake in this study both datasets shall be referred to as 'surveys'.

3.1.3.3 Zimbabwean-born population by duration

An examination of the distribution of Zimbabwean-born population by year of arrival in South Africa is presented in Figure 3.4. The distribution seems consistent for both males and females as recorded from each survey. Interestingly, when comparing the two data sources, they seem to exhibit significant regular features of the trend in numbers which include a peak of immigrants in 1980[9], 2000 and 2008. These humps are not accidental but reflect the different phases of social strife and economic meltdown which impacted Zimbabwe leading to increased migration of its citizens as observed by (Crush, Chikanda and Tawodzera 2015; Muzondidya 2010). This consistency between the two data sources on reflecting real events is worth mentioning as it also reflects consistency in the definitions used in the surveys to qualify migrants. The 2016 CS distribution shows, there is a major drop of migrants who arrived in 2011, which is not the case in 2011 Census results. It is important to mention that, although the datasets are consistent in their patterns, there are discrepancies in total numbers counted, for example, the 2016 CS recorded significantly fewer migrants each year compared to the 2011 Census. Issues of sampling, non-sampling errors and weighting should not be ignored in the case of CS 2016.

Figure 3.4: Proportion of migrants by year moved for the 2011 Census and 2016 CS

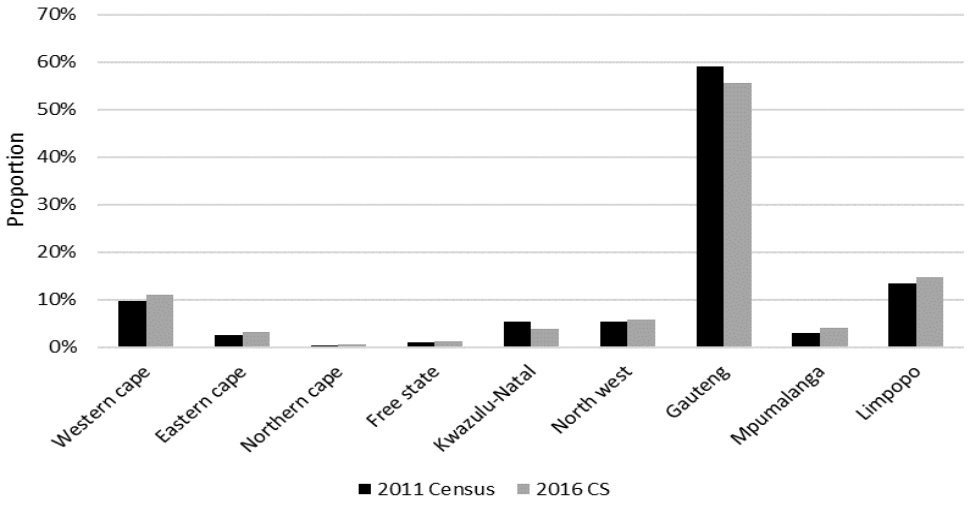


[9] Further investigations showed that most of the Zimbabwean-born migrants who came to South Africa in this year were predominantly white accounting for about 80 per cent of migrants and this feature is significant on both datasets.

3.1.3.4 Distribution of migrants by province

Figure 3.5 shows a degree of consistency in the proportional distribution of the migrant population by province. Evidence from the two datasets shows that Western Cape, Limpopo and Gauteng are the most preferred destinations for migrants and the pattern seems consistent for the two surveys. These account for more than 80 per cent of the Zimbabwean-born population in South Africa.

Figure 3.5: Migrants percent distribution by the province of enumeration.



Gauteng remains the largest migrant-receiving province, taking more than 50 per cent of the total migrant population, possibly due to its dominance in commerce and industry. However, Gauteng seems to have recorded the highest proportional decrease of total migrants between 2011 and 2016, followed by KwaZulu-Natal. The possible explanation for this decline could be congestion leading to competition for resources and opportunities; hence recent entries may find it difficult to secure a good living, leading to their outflow into other provinces. Anti-migrant activities caused by, for example, xenophobia might be driving migrants to other provinces. Also, positive forces in other provinces may be attracting people from Gauteng and KwaZulu-Natal, for example, better employment opportunities.

3.2 Multiplicative Component Model

The multiplicative component model, a method suggested by Rogers, Willekens, Little *et al.* (2002) is used in this study to describe and analyse migration flows between origin province (i) and destination province (j), and identify important underlying structures of the flows. The authors show that these migration flow tables can be disaggregated into four separate multiplicative components. Consider migration from an origin

province (i) to a destination province (j) n_{ij} such that $n_{ii} = 0$. Now if we denote the total number of out-migrants from the province (i), n_{i+} the total number of in-migrants to province (j), n_{+j} and the overall level of migration, n_{++} then the multiplicative component model is defined as:

$$n_{ij} = (T)(O_i)(D_j)(OD_{ij}) \qquad i \neq j \tag{1}$$

Where*:*

i. *T* is the total number of migrants, representing an overall component of the system (n_{++}),

ii. O_i is the proportion of all migrants from the province which represent the relative "push" factors from each province (i),

iii. D_j is the proportion of all persons moving to a province, representing the relative "pull" factors to each province (j),

iv. OD_{ij} is interaction term, which is the ratio of observed to expected migration flows based on the assumption that components are independent (Raymer 2008). It represents all other effects not explained by the overall and main components. It also captures the association between origin and destination provinces

These place-to-place migration flows (without age) can be represented in a two-way contingency table. Table 3.3 shows the outline of the initial two-way migration table required in deriving the multiplicative components. The components of the table represent observed numbers of migrants from origin to destination region.

Table 3.3: Notation for an origin by destination migration flow table for a four-region country

Region of Origin	Region of Destination				
	1	2	3	4	Total
1	0	n_{12}	n_{13}	n_{14}	n_{1+}
2	n_{21}	0	n_{23}	n_{24}	n_{2+}
3	n_{31}	n_{32}	0	n_{34}	n_{3+}
4	n_{41}	n_{42}	n_{43}	0	n_{4+}
Total	n_{+1}	n_{+2}	n_{+3}	n_{+4}	n_{++}

Table 3.4: Multiplicative components of interregional migration for a four-region country

Region of Origin	Region of Destination 1	2	3	4	Total
1	0	OD_{12}	OD_{13}	OD_{14}	O_1
2	OD_{21}	0	OD_{23}	OD_{24}	O_2
3	OD_{31}	OD_{32}	0	OD_{34}	O_3
4	OD_{41}	OD_{42}	OD_{43}	0	O_4
Total	D_1	D_2	D_3	D_4	T

Table 3.4 shows the multiplicative components of the migration flows derived from Table 3.3. The interaction component OD_{ij} defines the connectivity between the origin (i) and destination (j).

The model described by equation (1) can also be extended to incorporate origin-destination age-specific migration flows specified as:

$$n_{ijx} = (T)(O_i)(D_j)(A_x)(OD_{ij})(OA_{ix})(DA_{jx})(ODA_{ijx}) \qquad i \neq j \quad (2)$$

where A_x is the proportion of all migrants in age group (x) and n_{ijx} is an observed flow of migration from the origin (i) to destination (j) for age group (x).

This model contains eight multiplicative components, namely, the overall level of migration, the three main components, three two-way interaction components and one three-way interaction component. The components of this model are calculated with reference to *T,* the component representing the total level of migration in the system $T = n_{+++}$. The three main components of this model representing the proportions of all migrants from origin to destination in each age group are calculated as follows:

$$O_i = \frac{n_{i++}}{T}$$

$$D_j = \frac{n_{+j+}}{T}$$

$$A_x = \frac{n_{++x}}{T}$$

Raymer (2008) notes that on the assumption of independence between components, the interaction components represent the ratios of observed to expected migration flows and are calculated as follows:

$$OD_{ij} = \frac{n_{ij+}}{(T)(O_i)(D_j)}$$

$$OA_{ix} = \frac{n_{i+x}}{(T)(O_i)(A_x)}$$

$$DA_{jx} = \frac{n_{+jx}}{(T)(D_j)(A_x)}$$

OD_{ij} retains its definition from the simpler model (1), while OA_{ix} and DA_{jx} represent the deviations from the overall age profile of immigrants. This can be interpreted as the ratio of the age compositions of emigration and immigration to the overall age pattern. ODA_{ijx} interaction component is relatively complex to interpret, hence it is generally ignored, partly because the other seven components capture almost all the effects (Raymer, Bonaguidi and Valentini 2006).

3.2.1 Interpretation of the multiplicative components

In order to illustrate multiplicative components and their interpretation, consider a hypothetical scenario with a migration flow of 856 persons from region '1' to the region '4' such that:

$T = n_{++}$=71 648; $n_{ij} = n_{14}$ =856; $n_{i+} = n_{1+}$ =13 985; $n_{+j} = n_{+4}$=8 802

This flow can be disaggregated into the four multiplicative components as follows:

$$n_{14} = (T)(O_1)(D_4)(OD_{14})$$

$$n_{14} = (T)(\frac{n_{1+}}{T})(\frac{n_{+4}}{T})[\frac{n_{14}}{(T)(\frac{n_{1+}}{T})(\frac{n_{+4}}{T})}]$$

$$n_{14} = 71648(\frac{13985}{71648})(\frac{8802}{71648})(\frac{856}{1718})$$

$$n_{14} = 71648(0.195)(0.123)(0.498) = 856$$

The components are interpreted as follows: the overall component is the total number of interregional migrants at a given time, which is 71 648 persons. The origin component represents the proportion of all migrants from region '1', which is 19.5 per cent of all migrants. The destination component represents the proportion of all migrants moving to region '4', which is 12.3 per cent. Lastly, the interaction component represents the ratio of observed migration to the expected on the basis of these proportions; thus, there were 49.8 observed migrants between region '1' and '4' for every 100 expected. This ratio captures the connection between regions, for example,

the value of 0.498 indicates a weak association between the above-mentioned two regions (Little and Raymer 2013; Raymer and Rogers 2007). Furthermore, this can also imply that the flows between region '1' and region '4' are observed to be about 50 per cent lower than expected on the basis of proportions migrating from the origin (i) and migrating to the destination (j).

3.2.2 Comparing multiplicative component models

Comparison of origin-destination migration flows by sex and period can be easily achieved through the multiplicative component framework. For the period, migrants from a given system of regions (in this case, provinces in South Africa) will be decomposed by taking the ratio of the two sets of components from both periods to examine the stability of migration patterns over-time without confounding other effects in overall levels of migration. Decomposition by sex also follows the same procedure, enabling examination of migration patterns between males and females for any differentials and/or similarities. If the ratios depart substantially from one, this indicates the migration structure changed over time or that it is significantly different by sex. Comparing flow-specific components over time and by sex will help identify the cause of change in migration flows, whether the proportion of out-migrants or in-migrants changed and the change in the connectivity between regions.

This method uses data from both the 2011 Census and the 2016 Survey respectively to analyse migration patterns. This follows Willekens (1999), who notes that although usually conducted only every 10 years, censuses provide detailed information on migration and if combined with more recent survey data which give aggregate information, may provide acceptable information for migration modelling and analysis. An important feature of censuses or surveys is that they capture information on change of place of residence, that is, place of residence at the time of the census or survey by the previous place of residence at an earlier point in time. However, international migration data usually suffer from errors[10] because of inconsistencies in definitions of who is a migrant, data collection methods, and most importantly, whether fear of victimization leads to illegal migrants not identifying themselves. The accuracy of the place of prior residence and time of movement remain key to producing plausible estimates of migration stocks and flows from censuses and surveys. In general, the two

[10] Completeness of censuses and coverage of surveys remain major drivers of errors in migration data.

datasets are expected to present a reasonable picture of international migration in South Africa, although gaps and errors may still exist.

3.3 Logistic regression framework

This section describes the logistic regression model to be used to gain insights into the characteristics of Zimbabwean-born migrants in South Africa, specifically internal movers vs non-movers. Internal migration of migrants is an important component in local population dynamics, community development, and sustainability at both provincial and district level; hence the need to identify the attributes of migrants moving from one province to another. This study employs the use of logistic regression to identify the covariates of migrant movers compared to non-movers. Migration decision from one province to another has a dichotomous outcome-the migrant either moves or does not move (settles at the initial place of residence). Such an outcome can be analyzed using logistic regression (Cox and Snell 1989). This model can be used to assess the influence of various socio-economic and demographic characteristics on the likelihood of migrating from the initial province of residence. The main advantage of using this model is that it is not necessary to assume the distribution of the independent variables as they necessarily do not need to be normally distributed. The other advantage is that these covariates do not have to be linearly related to the dependent variable.

The dependent variable in this study is the decision to migrate (internally) which is a dummy variable classified as '1' if migrant moved to another province of residence and '0' if the migrant did not move. In short, the log odds of migrating to another province are given by:

$$\text{logit}(\pi_i) = \ln\left(\frac{\pi_i}{1-\pi_i}\right) = \alpha + \sum_i \beta_i X_i + \varepsilon_i \qquad (3)$$

where α is the constant of the model, β_i is the coefficient of the i^{th} predictor variable in the model and X_i's are the covariates of the model which include age, sex, employment status, education, marital status, level of income, province of origin and duration of stay. The parameter π_i is the probability of an individual in province (i) moving (to another province (j) and $i = j$ for non-movers). The logit model relates this probability to covariates while ensuring the predicted value of π lies between 0 and 1. This model computes the probability of moving using the odds ratio, thus if the odds

ratio of a covariate is greater than one then migrating to another province is more likely than not migrating and vice-versa.

First, only regression results from the 2011 dataset are obtained, and then for comparison purposes, both the 2011 Census and 2016 CS datasets are used. It is important to note that these data are not panel data since specific individuals cannot be followed in different time periods. However, it is possible to get some sense of the temporal pattern and stability of parameter estimates over time relative to the observations in 2011 regression results. To achieve this, the data from both cross-sections are pooled and time dummy variables are used to partially control for the time effects. This facilitates the comparison of the effects of individual characteristics on the migration decision across time.

4 RESULTS AND ANALYSIS

This chapter presents the results of the analysis in six sections for both datasets. Section 4.1 provides an analysis of the spatial patterns of migration to and within South Africa. It gives a broad overview of the areas of origin and destination of migrants at both provincial and district level. Section 4.2 presents migration systems from the multiplicative component (TOD) model at provincial level. Section 4.3 presents results from the TOD model by sex and Section 4.4 presents results from the (TODA) model. Section 4.5 extends the analysis in the preceding sections to metropolitan/district level. Section 4.6 compares the consistency of the results from the two datasets. Finally, Section 4.7 describes the socio-demographic characteristics of Zimbabwean migrants as well those who migrate internally, particularly as to how these characteristics affect their secondary migration propensities. Regression results and interpretations are also presented in this section.

4.1 Migration trends and patterns: Aggregate data

This section gives an overview of the geospatial distribution of migrants across the nine provinces of South Africa. Population redistribution patterns and trends for migration are presented. This analysis relates to patterns in inter-provincial migration both by age and sex, reflecting largely on the movement of individuals between areas, ranging from provinces to metropolitan areas. It also accounts for the extent of internal migration in South Africa of those born in Zimbabwe in each of the 2006-2011 and 2011-2016 periods. Migration effectiveness and net migration loss and gains are also presented in this section. The results from both the 2011 Census and 2016 Community Survey are first presented and then compared, to understand better any inconsistencies in the results.

4.1.1 Provincial migration flows

The 2011 Census recorded a total population of 674 056 Zimbabwean-born in South Africa, and of these, a total of 321 464 (almost 50 per cent of the total) moved either from one province to another or arrived in South Africa in the period between 2006-2011. On the other hand, the 2016 Community Survey recorded a Zimbabwean-born population of 574 047 in South Africa, implying a decline in the total number of Zimbabweans obtained from the census five years earlier. This is, however, subject to sampling errors, as discussed in the previous chapter. Out of these, a total of 126 490

(less than 50 per cent of movers recorded in the previous census period) moved in the period 2011-2016. The main variables used to populate Table 4.1 are derived from migrant's responses to migration questions on the province of previous residence and the current province of residence. The inter-provincial migration patterns for both periods presented in Table 4.1A and Table 4.1B show (bottom row) that Gauteng was the main destination, followed by Limpopo and the Western Cape. It is possible that, due to its close proximity to Zimbabwe, Limpopo remains one of the choice destination of migrants as they prefer being close to Zimbabwe while for Gauteng and Western Cape the observations are consistent with those by Dorrington and Moultrie (2009), who observed that since these two provinces are the most significant industrial provinces in South Africa, the dominance of the migration streams to these two provinces, provides strong evidence of economic motivations for migration. The other noticeable similarity in the inter-provincial movements for both periods shown in Table 4.1 is that across the nine provinces, Gauteng had the largest number of out-migrants followed by Limpopo.

Table 4.1: Inter-provincial migration of Zimbabwean-born migrants to and within South Africa

A. 2006-2011

	Province of Destination									
Origin	WC	EC	NC	FS	KZ	NW	GP	MP	LP	Total
WC	-	340	26	46	251	111	1 520	87	238	2 619
EC	924	-	0	158	492	267	3 845	350	503	6 538
NC	36	14	-	24	51	47	317	12	49	548
FS	96	24	0	-	62	12	584	45	172	994
KZ	984	341	89	124	-	147	2 451	225	528	4 889
NW	150	61	32	36	78	-	909	52	176	1 493
GP	2 530	625	109	321	1 274	2 201	-	1 299	2 573	10 932
MP	91	75	25	23	48	80	1 010	-	528	1 881
LP	899	221	117	127	616	719	4 531	577	-	7 807
OSA	28 904	7 194	1 215	2 882	13 607	20 121	145 344	8 757	55 739	283 763
Total	3 4613	8 895	1 613	3 740	16 478	23 705	160 510	11 404	60 506	321 464

B. 2011-2016

Origin	WC	EC	NC	FS	KZ	NW	GP	MP	LP	Total
WC	-	204	50	0	0	54	412	0	153	874
EC	150	-	0	0	95	52	213	61	101	673
NC	21	0	-	0	19	0	31	0	3	73
FS	0	41	0	-	0	40	161	14	0	256
KZ	288	159	0	30	-	18	349	219	73	1135
NW	94	12	80	25	18	-	487	0	91	807
GP	1 619	580	91	145	301	1 227	-	826	1 009	5 798
MP	35	0	0	0	56	168	448	-	241	948
LP	22	74	48	58	31	279	642	197	-	1 352
OSA	13 151	3 746	945	1 477	4 397	7 306	54 118	4 191	25 242	114 574
Total	15 380	4 817	1 214	1 734	4 916	9 145	56 862	5 509	26 913	126 490

For both periods, the last column of Table 4.1 (both tables) shows that international migration, that is recent migrants who came directly from outside South Africa, contributed over 90 per cent of the total migration. Of these, about 50 per cent went into Gauteng province followed by Limpopo which attracted about 10 per cent of the total international migration. In general, the interregional migration patterns for both periods were similar in terms of main receiving provinces. Worth noting is the difference in the magnitude of international migration numbers between the two periods, showing a reduction of inflows by more than 50 per cent in the period 2011-2016.

Migration effectiveness ratio is derived by dividing net migration by gross migration. It measures the difference between the effective addition and loss through migration compared to the overall gross movement. A negative value implies a net sending province while a positive value implies a net receiving province and the magnitude of the ratio indicates the size of the net relative to gross migration.

Table 4.2: Inter-provincial net migration of Zimbabwean-born population in South Africa.

B. 2006-2011

Province	Out-migrants	In-migrants	Net migrants	Migration effectiveness ratio
WC	2 619	5 709	3 090	0.371
EC	6 538	1 701	-4 837	-0.587
NC	548	398	-150	-0.159
FS	994	858	-137	-0.074
KZ	4 889	2 871	-2 018	-0.260
NW	1 493	3 584	2 091	0.412
GP	10 932	15 166	4 235	0.162
MP	1 881	2 647	766	0.169
LP	7 807	4 767	-3 041	-0.242
Total	37 701	37 701		

B. 2011-2016

Province	Out-migrants	In-migrants	Net migrants	Migration effectiveness ratio
WC	874	2 229	1 355	0.437
EC	673	1 071	398	0.228
NC	73	268	195	0.571
FS	256	257	1	0.001
KZ	1 135	519	-616	-0.373
NW	807	1 839	1 032	0.390
GP	5 798	2 744	-3 054	-0.358
MP	948	1 318	370	0.163
LP	1 352	1 671	319	0.106
Total	11 916	11 916		

Table 4.2 shows the net migration and effectiveness ratios of each province for internal movers for two periods under study. The results in Table 4.2A show that among the three major receiving provinces in South Africa, Gauteng and the Western Cape had positive net-gains of migrants while Limpopo had a net loss in the period. In contrast, for the later period shown in Table 4.1B, Limpopo and the Western Cape province recorded positive net migration while Gauteng recorded an effective net loss. The ratios (last column of Table 4.2A and Table 4.2B) show that the Western Cape province recorded the highest values for both periods, 0.371 and 0.437 respectively, indicating more in-migration relative to the size of out-migration for this province, among the major destination provinces. In other words, the Western Cape had the highest effective addition of migrants compared to Limpopo and Gauteng at both periods.

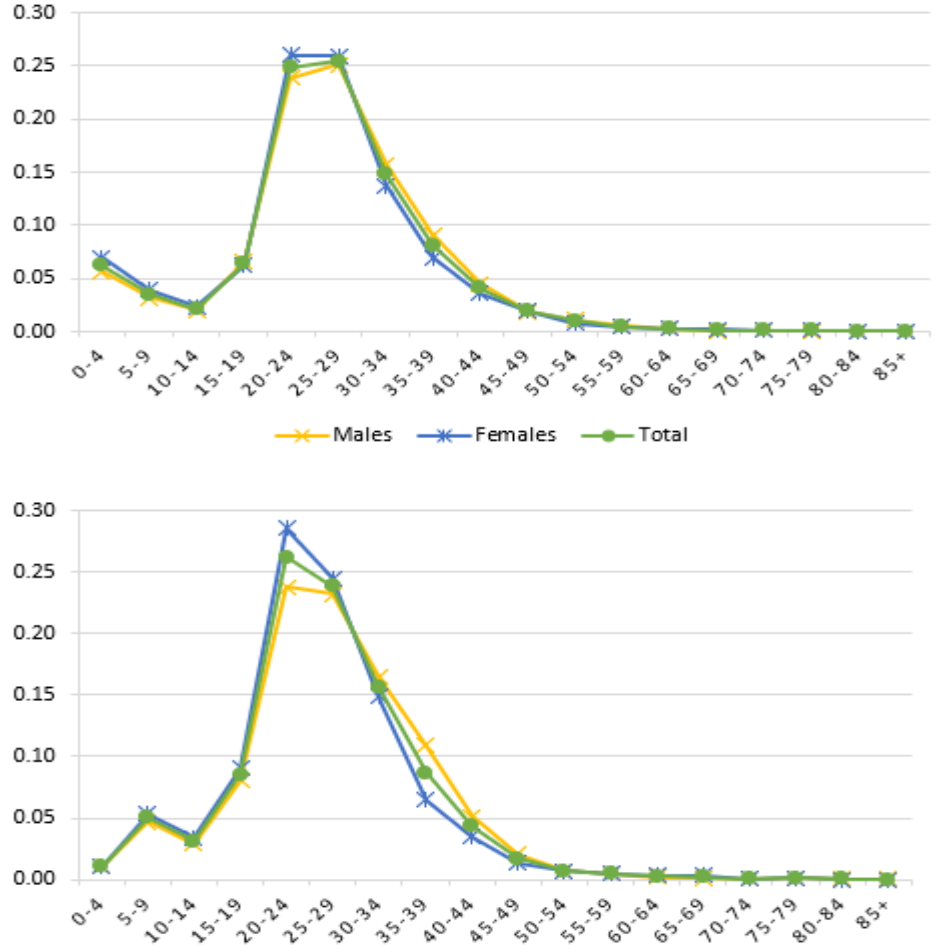
4.1.2 Age-sex distribution of migrants: 2006-2011 and 2011-2016

The data for migration from the 2011 Census shows that there were 184 136 (males) and 143 140 (females) Zimbabwean-born migrants who moved in the period 2006-2011 while in the 2016 CS, 62 801 males and 64 555 female migrants moved between 2011-2016. In aggregate, more males migrated (constituting 56.3 per cent of the overall movement) than females in the earlier period while more females migrated in the later period which might not be surprising considering the well-documented reversal of the previous male-dominated pattern of migration in the Southern African region. This reversal could be a real possibility as more women move to live with or be close to their spouses during that period and consequently, this could be escalated by the reversal of gender roles, as more women choose to work in both skilled and unskilled labour markets, seeking financial independence and acting as heads of households.

Despite the differences in actual numbers of migrants, there is reasonable consistency in the age distribution of migrants by sex in the period 2006-2011(upper panel) as well as in 2011-2016 period (lower panel) as shown in Figure 4.1. There is general consistency between the male and female age distributions and the distributions conform to Rogers and Castro migration schedules. Clearly, most migration is concentrated in the ages 15 to 39 years, with the labour force peak around the 20-29 age group. Furthermore, the 2006-2011 distribution shows a significant proportion of child migrants (0-4 years) for both sexes, a clear reflection of adults migrating with their young children. In contrast, the earlier observed boom in child migrants is close to

insignificant in the later period 2011-2016 (lower panel), which is quite surprising considering the proportions of young adults in the migration stream.

Figure 4.1: **Age-sex specific distribution of migrants: 2006-2011 and 2011-2016**



However, this could reflect an undercount of the children (0-4 years) in the 2016 CS, or a possible decline, considering the new immigration regulations[11] introduced with new requirements[12] for children traveling to or from the Republic of South Africa which possibly constrained child migration. This might mean few children migrated over the period, hence a decline in child mobility.

4.1.3 Migration flows: metros and non-metros

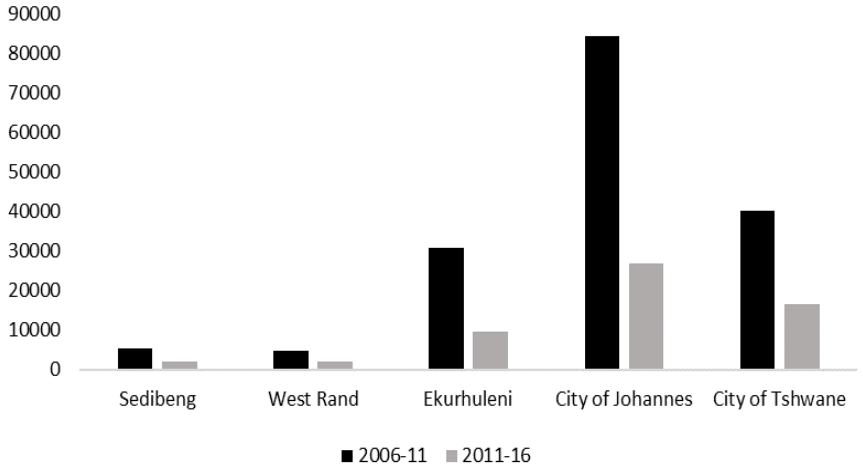
Migration patterns for major provinces are presented here to establish the districts in which most migrants are living and changes if any, thereof over the 2006-11 and 2011-16 periods. From both the 2011 Census and the 2016 CS, the following provinces

[11] http://www.home-affairs.gov.za/index.php/statements-speeches/621-advisory-new-requirements-for-children-travelling-through-south-african-ports-of-entry-effective-1-june-2015

[12] These requirements included, among others, that children of foreigners have full/unabridged birth certificates, parental consent Affidavit and valid passports for parent(s) accompanying the minor.

experienced the largest numbers of Zimbabwean-born migrants: Gauteng (GP), Limpopo (LP) and Western Cape (WC). Figure 4.2 shows the numbers of migrants who moved in both periods in Gauteng districts, clearly, the City of Johannesburg, City of Tshwane and Ekurhuleni are the main districts where these migrants live. The City of Johannesburg holds the major share of migrants, which is explained by the high levels of in-migration into this district. The results are consistent for both periods, 2006-11 to 2011-16.

Figure 4.2: Numbers of migrants by districts municipalities in Gauteng for 2006-11 relative 2011-16



For Limpopo province, Figure 4.3 indicates that most migrants live in the Vhembe and Capricorn districts. These two districts are geographically located close to Zimbabwe, which possibly indicates the migrants' preference to be closer to home (Zimbabwe). The observations are consistent for both periods.

Figure 4.3: Number of migrants by districts municipalities in Limpopo for 2006-11 relative 2011-16

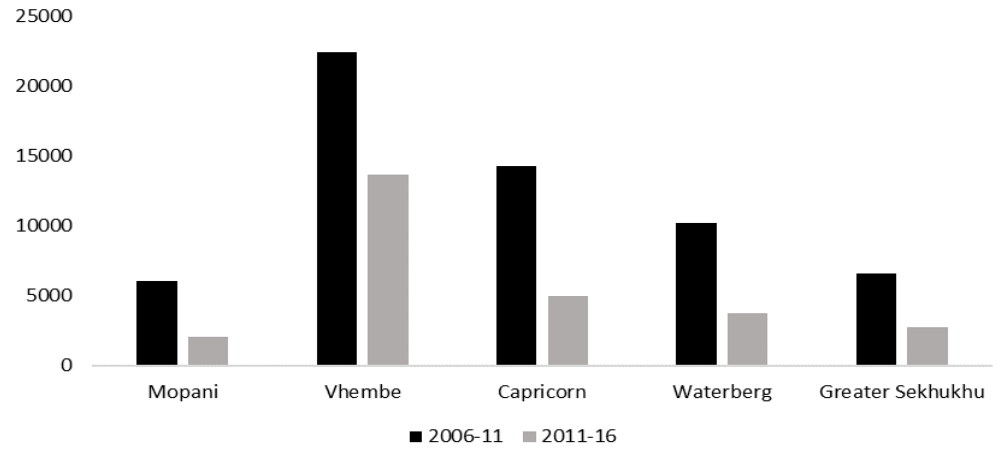
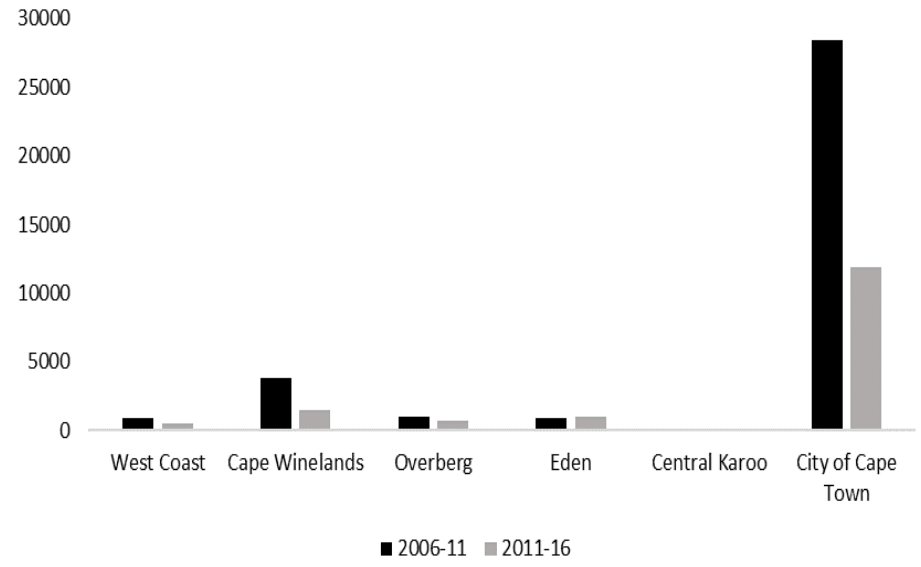


Figure 4.4 shows that the city of Cape Town is the district with most Zimbabwean-born migrants in the Western Cape Province. Although the number of migrants has declined in 2011-16 relative to the 2006-11 period, the dominance of migrants in the city of Cape Town is consistent over time. This can be explained by the high number of in-migration into this district from both outside South Africa and within (other provinces), possibly due to it being one of the major commercial districts in the country.

Figure 4.4: Numbers of migrants by districts municipalities in the Western Cape for 2006-11 relative 2011-16 period.



Unsurprisingly, the largest numbers of recent immigrants were enumerated in the major metropolitan areas: Gauteng metros combined, Cape Town, and Vhembe. From both datasets, subtracting total out-migration from total in-migration for those who moved in the periods for the three major metropolitan areas in the major receiving provinces of the country (Cape Town; the Gauteng metros combined and Vhembe), one can investigate the extent of migration to the respective districts over the period. For example, Table A.1 in Appendix A shows that net migration is most significant to the City of Cape Town, while Vhembe suffered a net loss of migrants for both periods. Surprisingly, the implication of these data is that Gauteng metros combined recorded a net loss in 2011-16 from a significant gain earlier in the 2006-11 period, which could imply a significant change of migration into the metros (combined) over the ten-year period.

4.2 Migration systems: Provincial

This section presents results of interregional migration structures from the TODA approach for the two periods: 2006-2011 and 2011-2016. The results are presented and compared for consistency. This analysis follows a hierarchical format, starting with the overall level, origin-destination and moving down to the three two-way interaction components. The migration data used represent transition data developed from information on current and previous places of residence obtained at the time of the census assuming that migrants were in the province of origin at the start of the period. Table 4.3 and Table 4.4, shows the components of interregional migration of Zimbabweans in South Africa over the period 2006-2011. The major sending provinces (O_i) and the major receiving provinces (D_j) can be seen as in both tables observed and discussed in sub-sectionProvincial migration flows4.1.1.

The ratios of observed flows to expected flows set out in the body of Table 4.3 capture the relative association between provinces for the period, for example, a value of equal to 2.15 indicates that the observed migrants were 2.15 times the expected migrants moving from Gauteng to the Western Cape (based on the marginal totals of migrants), that is simply the proportion of migrants from Western Cape to all provinces; and the proportion of migrants into Eastern Cape from all other provinces times the total number of migrants. In the same way, a component of 0.16 shows very high repulsion of North-West province with regard to the Free State contrasting with fairly high attraction in the opposite direction.

Table 4.3: Multiplicative components of interregional migration of Zimbabwean-born in South Africa, 2006-2011

	Destination									
Origin	WC	EC	NC	FS	KZ	NW	GP	MP	LP	Propn
WC		**4.70**	1.97	1.51	1.87	0.57	1.16	0.94	0.48	0.01
EC	1.31		0.00	**2.07**	1.47	0.55	1.18	1.51	0.41	**0.02**
NC	0.60	0.91		**3.74**	1.80	1.17	1.16	0.60	0.47	0.00
FS	0.89	0.87	0.00		1.22	0.16	1.18	1.27	0.92	0.00
KZ	1.87	**2.52**	**3.61**	**2.19**		0.41	1.00	1.30	0.57	0.02
NW	0.94	1.47	**4.24**	**2.05**	1.02		1.22	0.98	0.62	0.01
GP	**2.15**	**2.07**	1.99	**2.52**	**2.27**	**2.73**		**3.35**	1.25	**0.03**
MP	0.45	1.44	**2.70**	1.05	0.49	0.57	1.08		1.49	0.01
LP	1.07	1.02	**2.99**	1.39	1.54	1.25	1.16	**2.08**		**0.03**
OSA	0.95	0.92	0.85	0.87	0.94	0.96	1.03	0.87	1.04	**0.88**
Propn	**0.11**	0.03	0.01	0.01	0.05	0.07	**0.50**	0.04	**0.19**	1

More significant streams relative to expected proportions, indicating a strong association are shown in bold.

Using these various combinations of components, visible in these data are certain migration systems, a good example being a system connecting Gauteng, Mpumalanga and the Limpopo province for both periods. Significant in this pattern is the close geographical proximity of the three provinces, which facilitates movement between them. Secondly, most migration away from Gauteng and Mpumalanga to Limpopo could be of those retiring or those seeking work in the farms in this province. Other noticeable migration systems include a 'coastal migration system' connecting the three coastal provinces Western Cape, Eastern Cape, KwaZulu-Natal, with Gauteng as well as a system connecting Gauteng and North-West. Unsurprisingly, there is a strong association between Gauteng and the other eight provinces as both a major origin and destination of migrants compared to other provinces, showing the significance of this province as the industrial and commercial heartland of South Africa.

Table 4.4: Multiplicative components of interregional migration of Zimbabwean-born in South Africa, 2011-2016

	Destination									
Origin	WC	EC	NC	FS	KZ	NW	GP	MP	LP	Propn
WC		**6.14**	**5.94**	0.00	0.00	0.86	1.05	0.00	0.82	0.01
EC	1.84		1.00	0.00	**3.62**	1.07	0.70	**2.09**	0.71	0.01
NC	**2.31**	0.00		0.00	**6.50**	0.00	0.93	0.00	0.22	0.00
FS	0.00	**4.21**	1.00		0.00	**2.15**	1.40	1.29	0.00	0.00
KZ	**2.09**	**3.67**	0.00	1.90		0.22	0.68	**4.42**	0.30	0.01
NW	0.96	0.40	**10.30**	**2.25**	0.57		1.34	0.00	0.53	0.01
GP	**2.30**	**2.63**	1.63	1.82	1.34	**2.93**		**3.27**	0.82	**0.05**
MP	0.31	0.00	0.00	0.00	1.52	**2.45**	1.05		1.19	0.01
LP	0.13	1.44	**3.69**	**3.12**	0.59	**2.86**	1.06	**3.35**		0.01
OSA	0.94	0.86	0.86	0.94	0.99	0.88	1.05	0.84	1.04	**0.91**
Propn	**0.12**	0.04	0.01	0.01	0.04	0.07	**0.45**	0.04	**0.21**	1

However, there are some migration flows which exhibit high levels of association but involving relatively small numbers of migrants; these include migration from Mpumalanga, Limpopo, KwaZulu-Natal, and North-West to Northern Cape and Free State, and the Western Cape to Eastern Cape. For example, in Table 4.4 a migration system connecting North-West and the Northern Cape (10.3) but (0.0) in the opposite direction. This is not surprising, as some of the origin-destination components in this dataset are equal to 0, mostly for provinces with relatively low volumes of migrants, for example, Free State and Northern Cape, reflecting issues to do with the sampling and coverage in the survey as the most likely cause of this '0' effect or probably due to insignificant number of Zimbabwean-born migrants in that province.

4.3 Origin-Destination flows by sex

4.3.1 Multiplicative Components by sex: 2006-2011

Table 4.5 A and B, shows the origin-destination migration flows for the 2006-2011 male and female migrant populations. The number of male migrants is a little higher than the number of female migrants, representing 56.3 per cent of all interregional migration for the period. For both males and females there is consistency of the major sending provinces (O_i) and the major receiving provinces (D_j).

Table 4.5: Provincial migration flows by sex, 2006-2011

A. Males, T= 180 987

	WC	EC	NC	FS	KZ	NW	GP	MP	LP	Oi
WC		**4.35**	**3.30**	1.73	1.54	0.87	1.15	1.32	0.47	0.01
EC	1.03		1.00	1.14	1.54	0.57	1.27	1.58	0.46	**0.02**
NC	0.69	1.57		**5.14**	**2.27**	0.52	1.06	0.00	0.74	0.00
FS	0.98	0.63	1.00		1.04	0.00	1.21	1.12	1.05	0.00
KZ	1.81	**2.83**	**4.27**	1.97		0.44	1.01	1.17	0.61	0.02
NW	1.06	1.92	**3.93**	1.01	1.11		1.20	1.17	0.65	0.01
GP	**2.09**	1.81	**2.23**	**2.15**	1.94	**2.73**		**3.41**	1.11	**0.04**
MP	0.65	**2.38**	**2.19**	0.72	0.20	0.49	1.10		1.33	0.01
LP	1.29	1.18	**2.17**	1.07	1.75	1.26	1.15	1.86		**0.03**
OSA	0.94	0.90	0.83	0.92	0.94	0.96	1.03	0.85	1.06	**0.87**
Dj	**0.11**	0.03	0.01	0.01	0.05	0.08	**0.47**	0.04	**0.21**	1

B. Females, T= 140 477

	WC	EC	NC	FS	KZ	NW	GP	MP	LP	Oi
WC		**5.09**	1.00	1.12	**2.28**	0.15	1.16	0.43	0.50	0.01
EC	1.85		1.00	**4.90**	1.30	0.47	1.08	1.30	0.25	**0.02**
NC	0.48	1.00		1.00	1.13	**2.29**	1.28	1.54	1.00	0.00
FS	0.70	1.40	1.00		1.60	0.60	1.18	1.56	0.46	0.00
KZ	1.98	1.95	1.75	**2.47**		0.31	1.04	1.53	0.46	0.01
NW	0.74	0.75	**4.72**	**4.86**	0.87		1.27	0.61	0.55	0.00
GP	**2.24**	**2.47**	1.39	**3.33**	**2.82**	**2.63**		**3.17**	**1.49**	**0.03**
MP	0.15	1.00	**3.65**	1.90	0.96	0.72	1.05		1.76	0.01
LP	0.60	0.70	**4.92**	**2.22**	1.07	1.11	1.24	**2.52**		**0.02**
OSA	0.96	0.93	0.90	0.79	0.93	0.98	1.02	0.90	1.03	**0.90**
Dj	**0.11**	0.03	0.00	0.01	0.05	0.06	**0.54**	0.03	**0.16**	1

C. Ratio (A/B)

	WC	EC	NC	FS	KZ	NW	GP	MP	LP	
WC		0.9	**3.3**	**1.6**	0.7	**5.9**	1.0	**3.1**	0.9	0.9
EC	0.6		1.0	0.2	1.2	1.2	1.2	1.2	**1.8**	**1.5**
NC	**1.4**	**1.6**		**5.1**	**2.0**	0.2	0.8	0.0	0.7	**1.1**
FS	**1.4**	0.5	1.0		0.6	0.0	1.0	0.7	**2.3**	**1.7**
KZ	0.9	**1.5**	**2.4**	0.8		**1.4**	1.0	0.8	**1.3**	**1.4**
NW	**1.4**	**2.5**	0.8	0.2	**1.3**		0.9	**1.9**	1.2	**1.2**
GP	0.9	0.7	**1.6**	0.6	0.7	1.0		1.1	0.7	**1.3**
MP	**4.4**	**2.4**	0.6	0.4	0.2	0.7	1.0		0.8	**1.2**
LP	**2.2**	**1.7**	0.4	0.5	**1.6**	1.1	0.9	0.7		**1.6**
OSA	1.0	1.0	0.9	1.2	1.0	1.0	1.0	1.0	1.0	1.0
	1.0	1.0	**1.3**	**1.8**	1.0	**1.3**	0.9	**1.1**	**1.3**	

Note, numbers in bold and grey are ratios above 1.2 and less than 0.8 respectively, to represent relatively large differences between A and B.

From Table 4.5, the three dominant flows observed earlier are consistent between males and females, namely Gauteng (received the largest inflow for both groups), Limpopo and Western Cape. In terms of origin-destination flows, for internal movements, the flow from Limpopo to Gauteng dominated for both population males and females. Looking at the interaction components between provinces, the flows from the Western Cape to the Eastern Cape show a high level of association for both males and females. For males, flows from Northern Cape to Free State, KwaZulu-Natal to Northern Cape and Gauteng to North-West exhibited high levels of association. For females, flows into the Northern Cape from North-West, Limpopo, and Mpumalanga, as well as North-West to Free State and Gauteng to Limpopo, had high levels of association. We also notice that for both males and females, there is a relatively strong interaction between the Gauteng and all other provinces showing the significance of this province as the economic hub in South Africa.

Table 4.5C displays the ratios of male to female origin-destination migration flows. Several ratios deviate substantially from 1, often because they are derived from very small numbers obtained from the two datasets, although this may highlight that the actual flows do not correspond to expected flows for males compared to females. Unsurprisingly, migration flows from all provinces into Gauteng are very similar for both males and females showing the possible movement of migrants in family units. In addition, 7 out of 8 ratios for male-female migration flows from outside South Africa are equal to 1, a sign of an increase in female international migration propensities relative to their male counterparts.

4.3.2 Multiplicative Components by sex: 2011-2016

In Table 4.6A and B, both males and females show consistency on the major sending provinces and receiving provinces. Most internal migrants come from Gauteng (about 6 per cent of the total migrants) and the bulk (about 90 per cent) of the migrants come from outside South Africa consistent for both sexes. The major receiving provinces are Gauteng (receiving almost half of all migrants), Limpopo and the Western Cape taking over 70 per cent of migrants from both male and females. Compared to the other two major receiving provinces, Gauteng receives a relatively higher proportion of females than males. The interaction components in the table show a common migration system connecting Western Cape and Eastern Cape for both males and females. For males, other flows that exhibited high levels of association are Northern Cape to Gauteng, KwaZulu-Natal to Free State and Gauteng to North-West while for females these

mostly flow into the Northern Cape from North-West. Both Gauteng and Limpopo provinces receive a higher number of migrants from both sexes from outside the country relative to the expected numbers.

Table 4.6: Multiplicative components decomposition of inter-provincial migration in South Africa by sex, 2011-2016

A. Males, T= 62 292 — Destination

Origin	WC	EC	NC	FS	KZ	NW	GP	MP	LP	Oi
WC		**4.35**	**6.01**	0.00	0.00	1.00	1.19	0.00	0.82	0.01
EC	1.56		0.00	0.00	**3.51**	0.98	0.61	1.95	1.04	0.01
NC	0.00	0.00		0.00	0.00	0.00	1.99	0.00	0.80	0.00
FS	0.00	**4.46**	0.00		0.00	0.73	1.70	1.36	0.00	0.00
KZ	1.06	**4.10**	0.00	**3.42**		0.34	0.83	**5.06**	0.26	0.01
NW	1.10	0.75	**12.28**	**2.27**	0.00		1.21	0.00	0.75	0.01
GP	1.83	**2.53**	1.22	1.82	1.31	**2.70**		**2.96**	0.94	**0.06**
MP	0.45	0.00	0.00	0.00	1.49	1.96	1.08		1.19	0.01
LP	0.20	1.59	**2.42**	**3.16**	0.83	**2.90**	0.99	**3.38**		0.01
OSA	0.97	0.84	0.87	0.91	0.99	0.86	1.06	0.81	1.03	**0.88**
Dj	**0.12**	0.04	0.01	0.01	0.04	0.09	**0.41**	0.05	**0.23**	1

B. Females, T= 64 198

	WC	EC	NC	FS	KZ	NW	GP	MP	LP	Oi
WC		**8.24**	**5.72**	0.00	0.00	0.61	0.93	0.00	0.82	0.01
EC	**2.32**		0.00	0.00	**3.65**	1.10	0.88	**2.28**	0.00	0.00
NC	**3.14**	0.00		0.00	**9.30**	0.00	0.58	0.00	0.00	0.00
FS	0.00	0.00	0.00		0.00	**16.84**	0.00	0.00	0.00	0.00
KZ	**3.39**	**3.02**	0.00	0.00		0.00	0.55	**3.47**	0.36	0.01
NW	0.80	0.00	**7.45**	**2.23**	1.24		1.46	0.00	0.26	0.01
GP	**3.03**	**2.72**	**2.33**	1.82	1.34	**3.04**		**3.71**	0.56	**0.04**
MP	0.00	0.00	0.00	0.00	1.47	**3.30**	1.10		1.09	0.00
LP	0.00	1.04	**6.47**	**3.03**	0.00	**2.05**	1.27	**3.07**		0.01
OSA	0.92	0.88	0.85	0.97	0.99	0.91	1.04	0.88	1.04	**0.93**
Dj	**0.12**	0.04	0.01	0.01	0.04	0.06	**0.49**	0.04	**0.20**	1

C. Ratio (A/B)

	WC	EC	NC	FS	KZ	NW	GP	MP	LP	
WC		0.5	1.1	0.0	0.0	**1.6**	**1.3**	0.0	1.0	1.1
EC	0.7		0.0	0.0	1.0	0.9	0.7	0.9	0.0	1.8
NC	0.0	0.0		0.0	0.0	0.0	**3.4**	0.0	0.0	0.4
FS	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	9.3
KZ	0.3	**1.4**	0.0	0.0		0.0	**1.5**	**1.5**	0.7	1.3
NW	**1.4**	0.0	**1.6**	1.0	0.0		0.8	0.0	**2.8**	1.1
GP	0.6	0.9	0.5	1.0	1.0	0.9		0.8	**1.7**	1.6
MP	0.0	0.0	0.0	0.0	1.0	0.6	1.0		1.1	2.1
LP	0.0	**1.5**	0.4	1.0	0.0	**1.4**	0.8	1.1		2.1
OSA	1.1	0.9	1.0	0.9	1.0	0.9	1.0	0.9	1.0	1.0
	1.0	1.1	1.3	1.0	1.1	1.4	0.8	1.1	1.2	

The ratios of male to female origin-destination migration flows are shown in Table 4.6C to compare origin-destination migration structures by sex. Most origin-destination interaction structures between males and female's migration are insignificant for the period, with most ratios being '0's due to no representation in some provinces. For the

existing structures in Table 4.6C, there are some differences in the flow ratios by sex, for example; males dominate flows from Western Cape to Gauteng and Gauteng to Limpopo while females dominate flows from Gauteng to Western Cape and Limpopo to Gauteng among others. However, for some flows, the migration behaviour is similar for both sexes, for example; Western Cape to Limpopo. In addition, most of the ratios for migration flows from outside South Africa are equal to 1, a sign of balance between male and female international migration propensities.

4.4 TODA Analysis

The extension of the above analysis includes age. This helps to unpack, if any, important age patterns of migration within the major systems observed above. The age main effect component describes the age composition of all migrants in the multiregional system. The origin-age and destination-age interaction components can be used to identify important differences between age-specific out-migration and in-migration levels from the overall age profile of migration. The main focus is on the differences between observed age-specific migration flows and their corresponding expected flows hence this is intrinsic to identifying relative differences found in age patterns of in-migration and out-migration, respectively. To account for small numbers at older ages, we simply truncated the graphs at age 50 (hence open age 50+), as Zimbabwean immigrants after that age are very few.

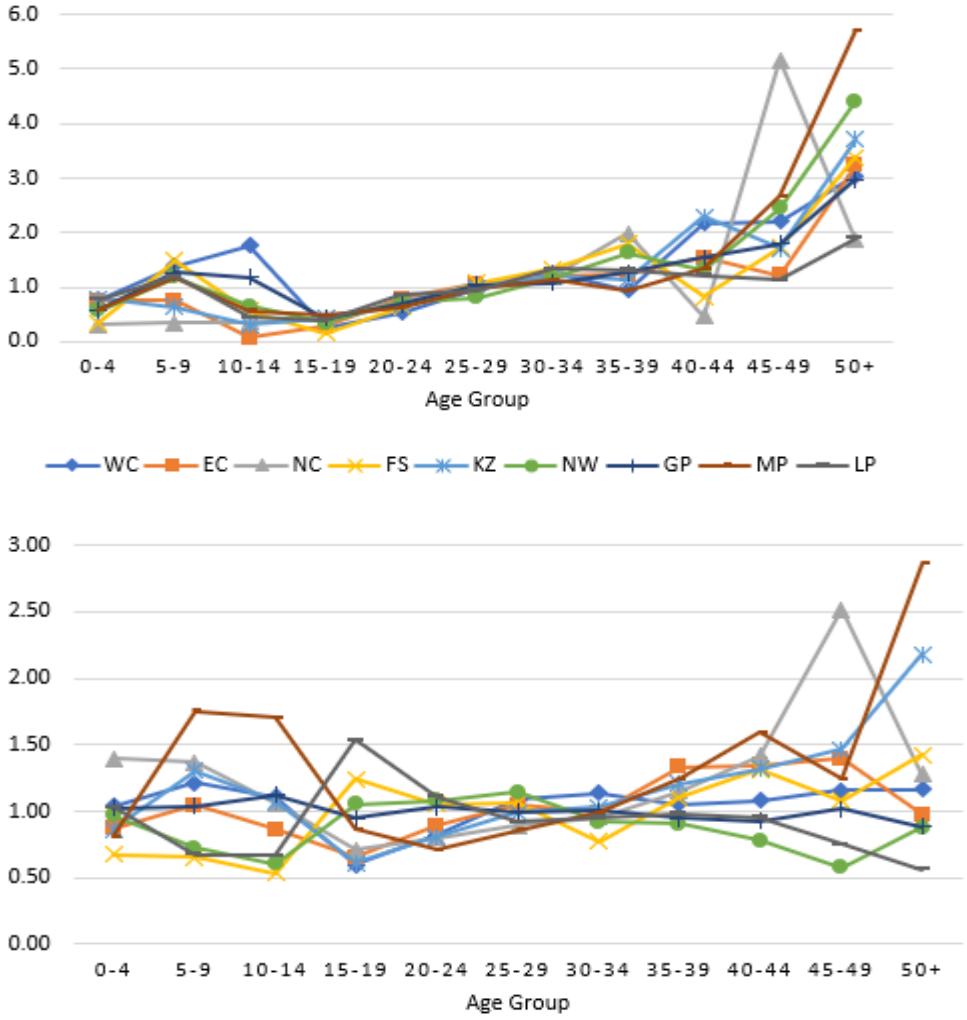
4.4.1 2006-2011 TODA results

Figure 4.5 shows a plot of provincial migration by age. The upper panel shows the migration propensities classified by the province of origin and age relative to that expected based on the proportions of the total migrants by age. The lower panel shows these relative propensities by the province of destination and age. In the upper panel, migrants originating from most of the provinces, especially in the Western Cape and Gauteng, are higher than expected at young ages; particularly lower than expected for young adults aged between 15 and 30 years, and much higher than expected at older ages around retirement. This suggests that in the period 2006-2011 young adults' resident in most provinces were less likely to migrate. High ratios at older ages are also apparent, which are possibly a result of small numbers of migrants at these ages.

The lower panel shows that when viewing migrants by their province of destination, more working-age Zimbabwean migrants, concentrated between ages 15 and 25, than expected move to Limpopo, while migration of young adults to the

Western Cape is lower than expected as shown in data on the relative migration propensities presented in Appendix C.

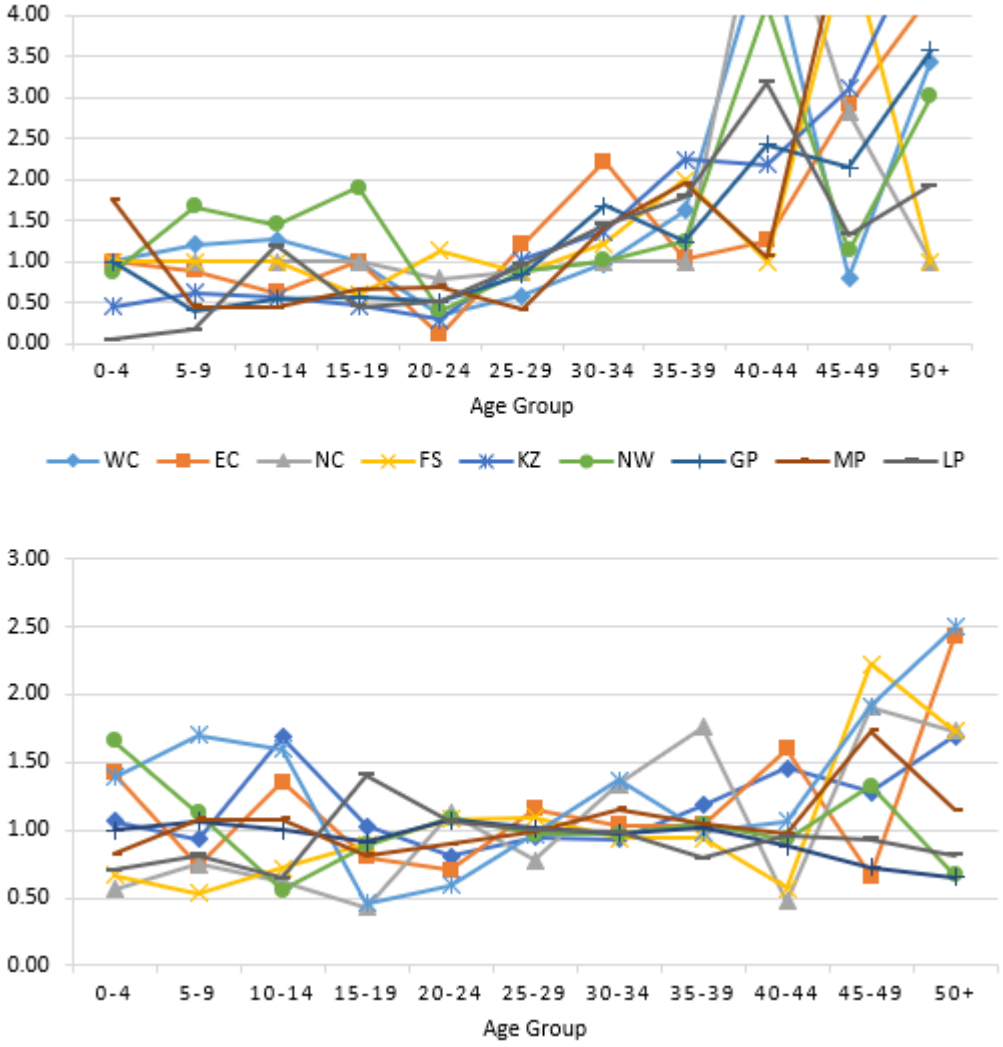
Figure 4.5: Relative migration propensities for Zimbabwean migrants, by origin (upper panel) and destination (lower panel) in South Africa: 2006-2011



4.4.2 2011-2016 TODA Results

Figure 4.6 shows the TODA results (as above) for the 2011-2016 period. The upper panel plot of provincial migration by age in Figure 4.6 shows that migrants originating from Gauteng and Limpopo are lower than expected at young ages, particularly for ages between 10 and 30 years and much higher than expected after age 40. Migration from the Western Cape shows a rather different picture, with young age out-migration slightly higher than expected, lower than expected for working-age population and rising above expectation at old ages. This might suggest that in general, the period 2011-2016 saw young adults' resident in these major provinces less likely to migrate, while young children were more likely to migrate only from the Western Cape probably as families.

Figure 4.6: Relative migration propensities for Zimbabwean migrants, by origin (upper panel) and destination (lower panel) in South Africa: 2011-2016.



The lower panel plot shows that viewing migrants by their destination province, more than expected working age migrants concentrated between ages 20 and 25 moves to the Limpopo (similar to the earlier findings), and those aged 10-20 move to the Western Cape, possible for furthering education. However, it is important to note that at older ages some ratios are '0' and/or way above '1' as a result of 'zero migrants moved' and/or small numbers of migrants in certain age groups of respective provinces in the period.

4.5 Migration flows and systems: metros

The data was disaggregated further into districts for both datasets: 2011 Census and 2016 CS to separate out-migration to and from the major metropolitan areas of the major receiving provinces. Using the major districts observed in section 4.1; Cape Town, Gauteng metros combined and Vhembe separated from their host provinces, the

same TODA approach is employed to investigate the extent to which migration to or from (say) Limpopo is between Vhembe and the rest of Limpopo; it captures the relative association between these metros and their host provinces or other districts. This further helps to identify patterns of migration at the district level, (if any).

Panel A of Table 4.7 shows the Zimbabwean-born migration flows between districts (metros and non-metros) during the 2006-2011 period. During this period, nearly half of all migrants in the Limpopo province are in Vhembe, and more than half of those in the Western Cape, are in Cape Town. Gauteng metros are the most significant sending and receiving metros in the country for the period. The ratios of observed to expected flows set out in panel B of Table 4.7 show some distinctive patterns of migration. For example, the ratio of 2.11 indicates twice as more movement from Gauteng metros to Cape Town than expected. Other flows that exhibited high levels of association were Vhembe and the rest of Limpopo province.

Table 4.7: District level migration spatial structure of Zimbabweans in South Africa, 2006-2011

A.Observed flows		Destination					
Origin	WC excl. Cape Town	GP Metros	Other districts	LP excl. Vhembe	Cape Town	Vhembe	Total
WC excl. Cape Town		4 159	1 501	373	1 060	106	7 200
GP Metros	1 147		5 547	549	1 966	359	10 567
Other districts	712	5 121		1 160	982	245	8 220
LP excl. Vhembe	178	2 465	1 468		562	251	4 924
Cape Town	859	1 209	290	115		11	2 485
Vhembe	98	927	280	650	94		2 050
OSA	12 234	146 145	46 733	33 771	23 468	21 519	283 869
Total	15 227	160 027	55 819	37 618	28 132	22 492	319 316
B. Multiplicative components							Oi
WC excl. Cape Town		1.15	1.19	0.44	1.67	0.21	0.02
GP Metros	**2.28**		**3.00**	1.24	**2.11**	0.48	0.03
Other districts	1.82	1.24		1.20	1.36	0.42	0.03
LP excl. Vhembe	0.76	1.00	1.71		1.30	0.72	0.02
Cape Town	**7.25**	0.97	0.67	0.39		0.06	0.01
Vhembe	1.01	0.90	0.78	**2.69**	0.52		0.01
OSA	0.90	1.03	0.94	1.01	0.94	1.08	**0.89**
Dj	0.048	**0.501**	0.175	0.118	0.088	0.070	1

Similarly, Table 4.8 shows migration flows between districts (metros and non-metros) during the 2011-2016 period as derived from the 2016 CS. More than half of all migrants in the Limpopo province moved to Vhembe, and Cape Town still receives more than half of all migrants in the Western Cape province. Also, Gauteng metros continue to be the main sending and receiving metros in the country across time. Interestingly, the most significant migration streams observed in the 2006-2011 period,

are also evident in the 2011-2016 period data, for example, a ratio of 2.53 in panel B of Table 4.8 shows a strong migration from Gauteng metros to Cape Town. Other noticeable flows include: more than expected inflows from outside South Africa to both Gauteng metros and Vhembe.

Table 4.8: District level migration spatial structure of Zimbabweans in South Africa, 2011-2016.

A. Observed flows		Destination					
Origin	WC excl. Cape Town	GP Metros	Other districts	LP excl. Vhembe	Cape Town	Vhembe	Total
WC excl. Cape Town		361	250	115	290	0	1 017
GP Metros	824		2 694	770	1 431	252	5 971
Other districts	347	1 419		265	303	159	2 493
LP excl. Vhembe	46	470	472		22	305	1 315
Cape Town	303	264	62	140		0	768
Vhembe	0	222	128	442	0		792
OSA	6 929	54 118	18 330	12 021	9 969	13 221	114 587
Total	8 448	56 855	21 935	13 753	12 015	13 937	126 943

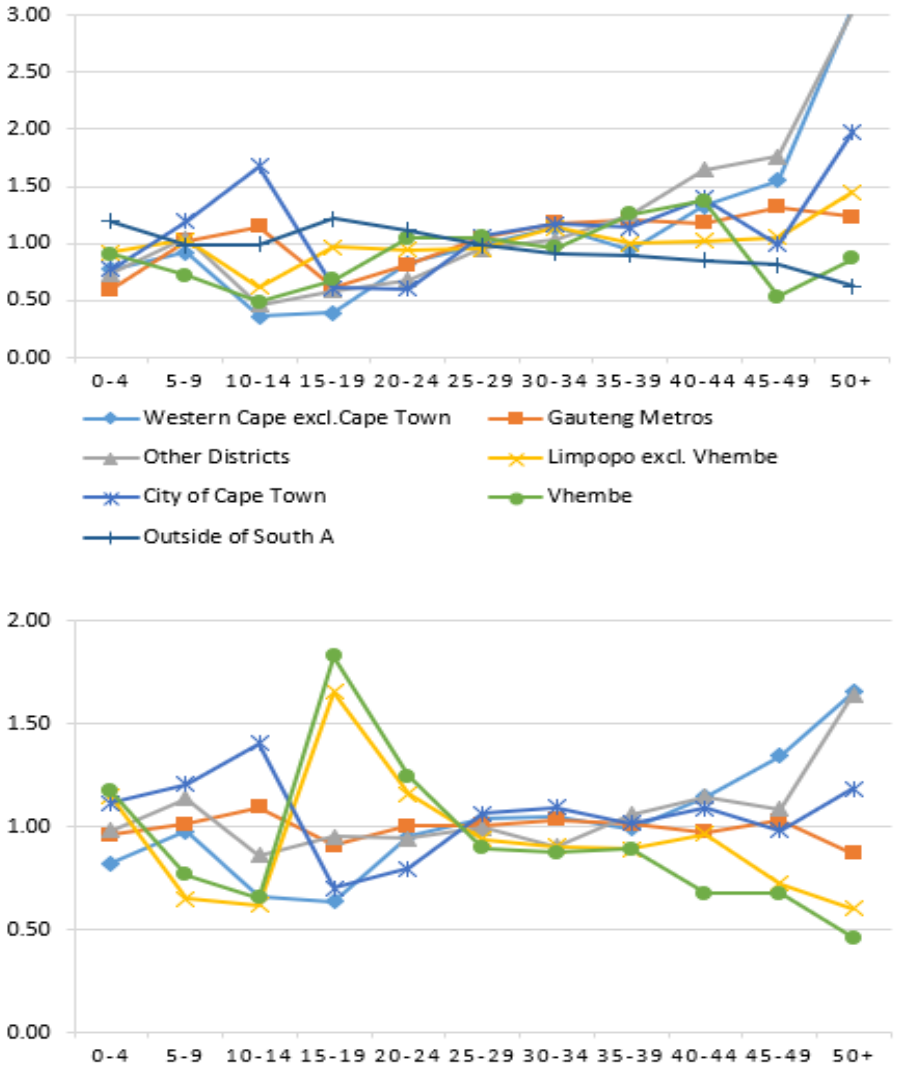
B. Multiplicative components

							Oi
WC excl. Cape Town		0.79	1.42	1.04	**3.02**	0.00	0.01
GP Metros	**2.07**		**2.61**	1.19	**2.53**	0.39	**0.05**
Other districts	**2.09**	1.27		0.98	1.28	0.58	0.02
LP excl. Vhembe	0.52	0.80	**2.08**		0.18	**2.11**	0.01
Cape Town	**5.93**	0.77	0.47	1.68		0.00	0.01
Vhembe	0.00	0.63	0.94	**5.15**	0.00		0.01
OSA	0.91	1.05	0.93	0.97	0.92	1.05	**0.90**
Dj	0.07	**0.45**	0.17	0.11	0.09	0.11	1

The extension of the above analysis which paints a clearer picture of migration dynamics at district level includes age. The age groups used in this study start with 0–4 years and end with 85+ years and are measured at the time of the census. In examining the origin-age components shown in the upper panel of Figure 4.7, we find that, particularly high propensities of migration of young children (5-20 years) from the city of Cape Town and (slightly) from Gauteng metros combined. For instance, this could possibly imply children moving as families out of Cape Town into the rest of Western Cape. Supporting this observation are high propensities of elderly migration especially towards retirement ages from both Cape Town and Gauteng metros (combined). The opposite is true for young children and elderly migration from Vhembe and the rest of Limpopo province. The bottom panel of Figure 4.7 shows that the age profiles of migrants migrating to Vhembe and the rest of Limpopo (border region) have higher than expected levels around young adult 15-30 ages, possibly migrating directly from Zimbabwe. In contrast, fewer than expected young adults move to the city of Cape Town while the young children's migration into this metro is higher than expected. For

the city of Cape Town, the above results reveal that it remains the highest sending and receiving metro of young migrants (aged 10-20 years) in South Africa.

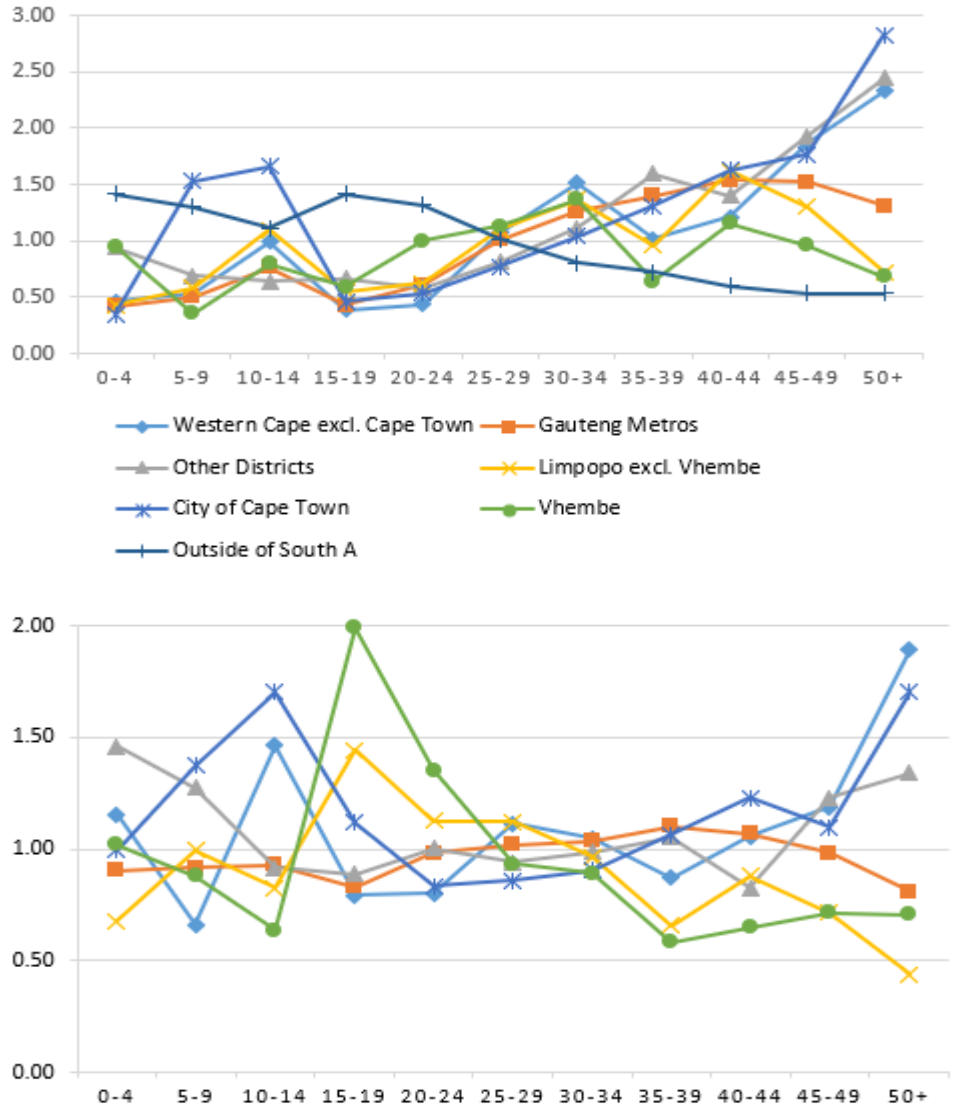
Figure 4.7: Relative migration propensities for Zimbabwean migrants by origin and destination district of residence, 2006-2011



Results from the 2016 CS for the 2011-2016 period show some consistency with those observed in the earlier period as shown in Figure 4.8. For example, from the upper panel children show higher than expected levels of migration from the city of Cape Town, whereas young adults out-migration from the city is lower than expected. Adults migration from the city of Cape Town is higher than expected, which probably explains the higher than expected ratios of young children leaving this metro. As for the destination-age ratios (lower panel), young adults exhibited higher than expected levels of migration to Vhembe and the rest of the border province of Limpopo. This is possibly due to higher than expected levels of young adult migration from outside South

Africa as shown in the upper panel of Figure 4.8. Persons older than 35 years are less likely to migrate into Limpopo. Young children (unaccompanied) are most likely to migrate into Cape Town and the rest of Western Cape.

Figure 4.8: Relative migration propensities for Zimbabwean migrants by origin and destination district of residence, 2011-2016

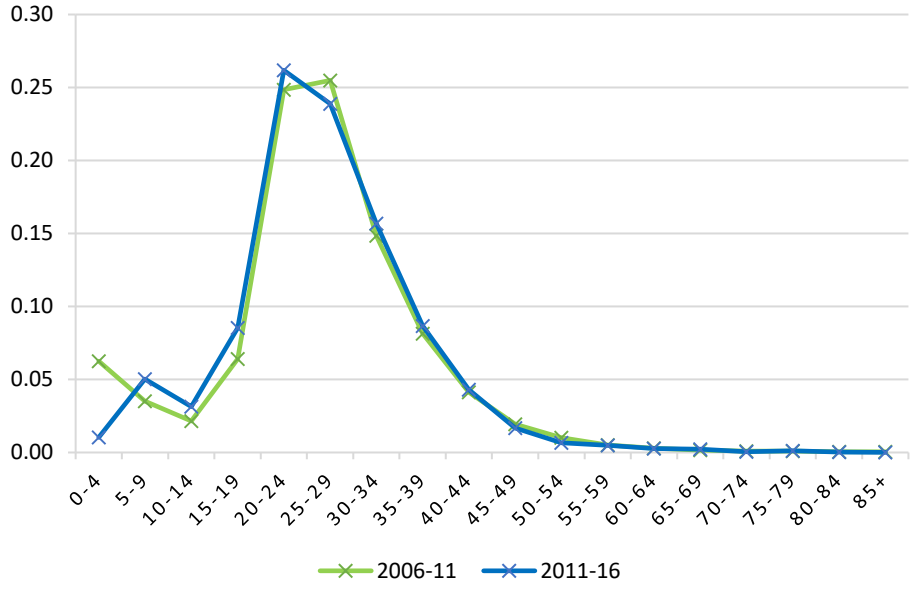


4.6 Comparison of migration patterns: 2006-2011 vs 2011-2016

This section compares the results from the two datasets for consistency as well as establishing if there are stable patterns in the migration dynamics of Zimbabwean migrants in South Africa over the two periods. As far as the comparison to the patterns of migration between the two periods is concerned, there is a strong similarity in the age distribution of overall internal migration over the two periods for the Zimbabwean-born population in South Africa. Figure 4.9 shows the age-distribution as derived from both the 2011 Census and the 2016 CS data. The bulk of migrants for both time intervals are

aged between 15 and 40 years. The results shown suggest that there may have been a shift in peak migration from 25-29 years in the period 2006-11 to 20-24 years in the period 2011-16.

Figure 4.9: Age distribution of migration for the Zimbabwean-born population in South Africa over the periods: 2006-2011 and 2011-2016



In aggregate, the age-specific migration patterns observed in the 2011 census are still prevalent in the 2016 CS. Much of the discrepancies that do emerge between the two patterns may be attributed to the unlikely drop observed in the 0-4 age group and possibly the smaller sample size (small numbers) in the 2011-2016 period data from the 2016 CS and many other issues as discussed earlier. It is, however, important to note that the overall age-distribution of Zimbabwean migrants in South Africa from both datasets conform to Rogers and Castro migration schedules.

A comparison of the metro level migration flows over time illustrates some interesting patterns (Table 4.9). The ratios of actual to expected migration from the city of Cape Town and Vhembe metros increased by 29 and 3 per cent respectively, while it decreased by 30 per cent in the case of Gauteng metros combined. The share of migration to Gauteng increased substantially whereas that to the city of Cape Town and Vhembe declined. Some interesting origin-destination interaction patterns are also apparent, for example, there is an increase the ratio of expected to actual migration from the city of Cape Town to Gauteng of 27 per cent, whereas that from Gauteng metros to the city of Cape Town declined by 17 per cent.

Table 4.9: Migration flow comparison by metro and non-metro districts: Ratios of 2011-2016 to 2006-2011 multiplicative components

Origin	WC Excl. Cape Town	Gauteng Metros	Other districts	LP excl. Vhembe	City of Cape Town	Vhembe	Total
WC excl. Cape Town		1.45	0.84	0.42	0.55	0.00	**2.82**
Gauteng Metros	1.10		1.15	1.04	0.83	1.25	0.70
Other districts	0.87	0.98		1.22	1.06	0.73	1.31
LP excl. Vhembe	1.44	1.25	0.82		**7.32**	0.34	1.49
City of Cape Town	1.22	1.27	1.44	0.23		0.00	1.29
Vhembe	0.00	1.44	0.83	0.52	0.00		1.03
OSA	0.99	0.97	1.02	1.04	1.02	1.02	0.98
Total	0.72	1.12	1.01	1.09	0.93	0.64	

4.7 Characteristics of migrants (movers vs non-movers)

The analysis of characteristics of migrants is confined to individuals aged 15 years and above on the basis, firstly, that these are the individuals who are more likely to have some say in decision-making over movement and, secondly, that these are the individuals for whom labour market information is relevant. The analysis is presented primarily at the individual level.

Table C.1 in Appendix C represents the descriptive statistics of socio-economic and demographic characteristics of respondents of the sample for both migrants (ever moved from the province of residence) and non-migrants (never moved from the province of residence). Focusing on all migrants (on aggregate) who moved in the period 2006-2011 and 2011-2016, as shown in

Table C.1, there are essential characteristics to note reflected in both datasets. Firstly, comparing by marital status most Zimbabwean-born migrants in South Africa are married. Secondly, distinguishing by education level, most migrants have secondary or higher education and lastly either formally or informally, most of these migrants are employed.

Focusing on inter-provincial migration, in the 2011 census, 20.7 per cent of the total migrants moved from their province of residence in the period 2006-2011 whereas, in the 2016 CS, only 13.2 per cent reported to have moved. These data suggest an overall reduction in the internal movement of migrants by almost 50 per cent reflecting a possible change in their migration behavior over time or, again, problems with the 2016 CS data. As highlighted earlier, there are more men than women migrants in the overall sample from both surveys hence men appear to be more likely to have moved than women (about 23.3 vs. 17.2 per cent, respectively in 2011 and about 14.7 vs. 11.4

per cent respectively in 2016). In the 2011 Census[13], migrants who were employed were slightly more likely to have moved than those unemployed (about 21.3 vs 19.3 per cent respectively). Unsurprisingly, migrants in Gauteng and the Western Cape are the least likely to have moved compared to those in other provinces and this is stable over time. This could be due to the level of urbanization and wealth in these provinces.

4.7.1 Logistic regression results

The effects of various socio-economic and demographic characteristics on the likelihood of a resident migrant migrating within South Africa at most 5-years before the 2011 Census are modelled using the logistic regression. First, the 2011 census model for those migrants who moved in the period 2006-2011 is presented (Table 4.10) and then second, to compare for the stability of effects and patterns over time, both the 2011 and 2016 datasets are pooled as discussed in the previous chapter.

Table 4.10 shows the results of fitting the regression model for the 2011 census data as well as the regression coefficients, their standard errors (SE), odds ratio and significance levels. According to the results of the model presented in Table 4.10 , all independent variables appear to have a statistically significant effect on inter-provincial migration of Zimbabwean-born migrants. With respect to the age of migrants, using age group 30-34 as a reference, the coefficients of all age groups generally increase as age increases, and are significant, reflecting that age is an important determinant of one's decision to move. This is also shown by the odds ratios, for example, the odds of moving from one province to another for an individual in the 50-54 age group is 1.52 times the odds of an individual in the 30-34 age group (reference group). One significant feature of the age of migrants on the propensity to move as shown by the odds ratios is that with reference to the 30-34 age group, younger migrants have lower odds (less than 1), whereas older migrants have higher odds (more than 1) of migrating and the ratios generally increase with age. Therefore, the 2011 census results show that the age of migrants increases the chance of inter-provincial migration.

Sex is also a significant factor in internal migration. The regression coefficient for female respondents is negative which means women have a lower risk of migration than men. The odds ratio for females is 0.762, which implies that the odds of women moving to another province is about 0.762 times lower than the odds of men moving. This might be related to the fact that most of these Zimbabwean-born migrants are married,

[13] In the 2016 Community survey, information on employment status was not collected.

hence, movement of women is highly family bound and possibly dependant on their partners.

Table 4.10: Odds of internal migration for migrants aged 15+ years, 2006-2011

Characteristics	b (Coefficient)	(SE)	odds ratio
Age			
15-19	-0.582***	0.04	0.559
20-24	-0.112***	0.02	0.894
25-29	-0.102***	0.02	0.903
30-34(ref)	-	-	1
35-39	-0.037	0.02	0.963
40-44	0.101***	0.03	1.106
45-49	0.201***	0.04	1.222
50+	0.419***	0.04	1.521
Sex			
1. Male (ref)	-	-	1
2. Female	-0.272***	0.01	0.762
Marital status			
1. Never married (ref)	-	-	1
2. Married or living with partner	-0.095***	0.01	0.909
3. Separated, divorced or widowed	-0.192***	0.04	0.825
Educational level			
1. No education (ref)	-	-	1
2. Primary	-0.314***	0.04	1.000
3. Secondary or higher	-0.557***	0.04	0.812
Employment status			
1. Not employed (ref)	-	-	1
2. Employed	0.036*	0.02	1.036
Arrival time (years)			
0-5 (ref)	-	-	1
6-14	-0.469***	0.02	0.626
15+	-0.287***	0.02	0.751
Province of residence			
1. Western Cape	0.792***	0.02	2.208
2. Eastern Cape	0.928***	0.03	2.529
3. Northern Cape	1.493***	0.07	4.450
4. Free State	1.694***	0.05	5.443
5. KwaZulu-Natal	1.026***	0.03	2.790
6. North-West	1.902***	0.03	6.698
7. Gauteng (ref)	-	-	1
8. Mpumalanga	2.049***	0.03	7.760
9. Limpopo	0.879***	0.02	2.409
Constant	-1.322***	0.04	0.266
(N)	172926		

* p<0.05, ** p<0.01, *** p<0.001

In the case of marital status, the coefficients for both the married or living with partner and separated, divorced or widowed are negative and decreasing respectively. This shows marriage reduces the chance of moving for migrants, which might be related to the fact that marriage comes with family hence increased cost of moving assuming

they are living with their families. In general, the non-married individuals have higher odds of moving than the married and those out of marriage which cements the sex effects disparities argument.

Also, it has been demonstrated in Table 4.10 that migrants with secondary or higher levels of education have a lower chance of moving to another province than those with no education, although their chance of migration is still high with an odds ratio of 0.812. The lower odds of migration might be related to the likelihood that those with higher levels of education are more likely to be engaged in formal employment, hence less need to move. Not surprising is the primary level category which is not significant in the model, showing that individuals with primary education are not significantly different from those with no education in terms of migration propensities.

The odds ratios for employment status categories (1.036 for employed relative to those not employed) show a very small difference in the risks of migrating for both groups and this suggests that after controlling for education, employment status does not matter. This is supported by results shown in Table C.2 (Appendix C) indicating the significance of the interaction effect between the two variables. However, the 3.6 per cent difference in the odds for the employed relative to the unemployed can be explained by that, most foreign migrants in South Africa are more likely to be employed in the informal sector which is characterized by lower levels of earnings as observed by Budlender and Fauvelle-Aymar (2014). This, therefore, leads to the need for migrants to always change jobs in search for better earnings, which might require one to move.

Finally, with respect to the province of residence, migrant residents in all the other eight provinces relative to those in Gauteng have significantly higher odds of moving. In general, migrants in the Gauteng province are less likely to move to another province compared to those in other provinces. This is probably because it is a highly urbanized centre of industry, mining and agriculture with better-developed infrastructure hence they remain preferred provinces of residence. Also, it could be that immigrants locate in provinces where there is already a large concentration of the same origin.

4.7.2 Comparison of effects and patterns over time, 2006-2011 and 2011-2016

To test for stability of effects over time, or ascertain changes over time, if any, the two datasets are pooled to control for the fact that respondents at respective surveys are different individuals whose information on the same characteristics is collected at different times' thus enabling a robust comparison of the 2011 census vs the 2016 CS

datasets. To achieve this, the logistic model is extended to include interaction terms, for example, the interaction between age and survey (2011 or 2016 CS) will help determine if the probability of migration across age has changed over the 10-year period. However, it is important to note that, interpretation of regression tables can be overwhelming in the case of interaction effects, categorical variables, or nonlinear models such as the logistic regression hence the raw coefficients are often not of much interest, but the interpretation of effects on outcomes such as probabilities.

The Stata 'margins' and 'marginsplot' commands allow the calculation of 1) the level of probabilities of migration with respect to each covariate at each period and 2) the relative change in the probability of migration, comparing 2016 and the 2011 data. While there are many migrants defining characteristics, in this study this comparison is limited to the interpretation of findings related to age, sex, and the province of residence variables primarily because some of the most interesting variations in an individual's propensity to migrate can be attributed to these characteristics.

Figure 4.10: Probability of migration by age across time, 2006-2011 vs 2011-2016

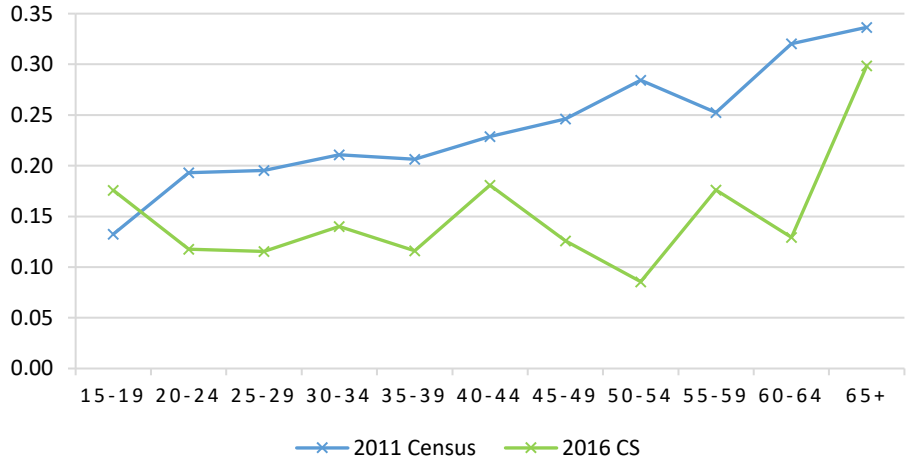


Figure 4.10 shows the probability of migration by age from each data source, over the five-year period. There is a clear pattern of a general increase in the probabilities of migration with an increase in age for the 2006-2011 period but not clear on a 2011-2016 period if excluding the open age group 65+. It is also notable that for the 2011-2016 period, the pattern at old ages is a distorted (not clear) which is largely due to low numbers recorded in these age groups. Migrants in the 15-19 age group are more likely to move in the 2011-2016 period than the 2006-2011 period, which seems rather odd. The general trend shows amongst movers (i.e. not volume related), that they are less likely to be moving in 2011-16 relative to 2006-2011.

Figure 4.11: Probability levels of migration by sex across time, 2006-2011 vs 2011-2016

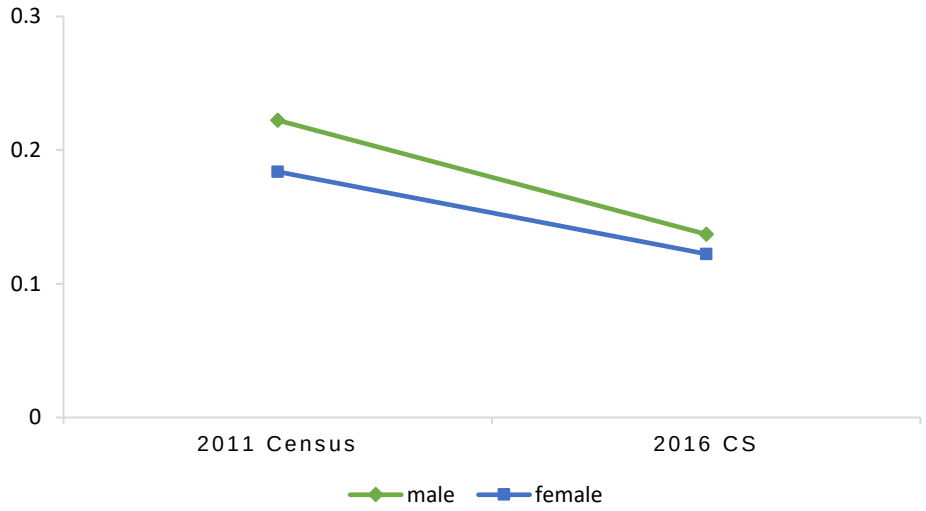
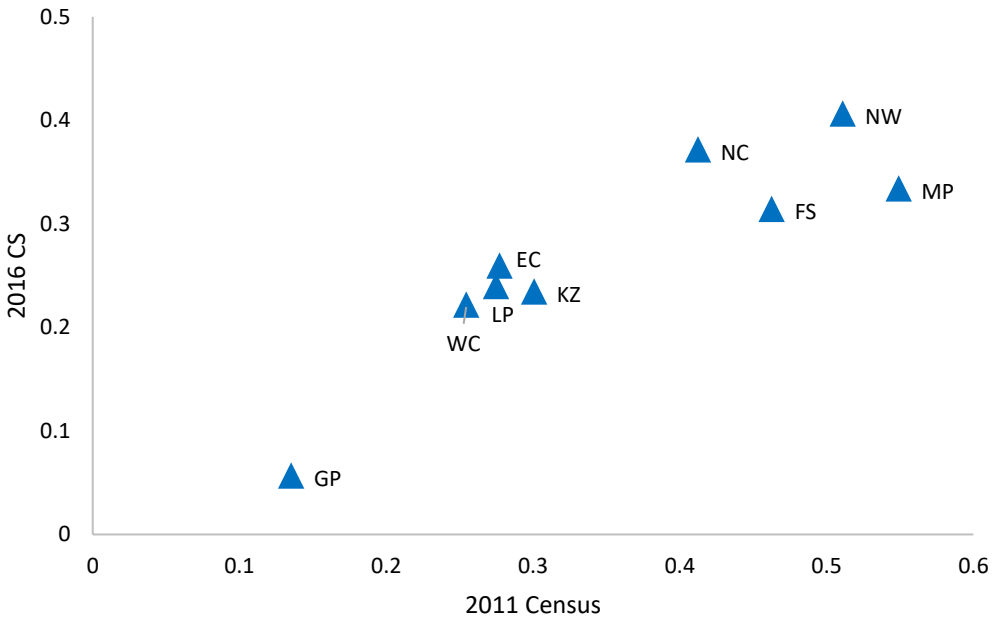


Figure 4.11 shows the probabilities of migration by sex across time. Clearly, men are more likely to migrate than their female counterparts and this is consistent over time. However, the difference seems to have narrowed in the 2016 dataset, which might reflect a catch-up effect for women in their mobility behavior. This might also mean an increase in family movements across provinces. In addition, it is also evident that the propensities to migrate for both males and females have decreased over time. However, males experienced a larger change (decrease) of migration probabilities than females in 2011-2016 relative to 2006-2011.

Figure 4.12: Probability levels of migration by province, 2006-2011 vs 2011-2016



At the provincial level, Figure 4.12 shows the probabilities of migration for an individual migrant resident in each of the nine South African provinces. Migrants resident in Gauteng have the least probability of moving, followed by those in the Western Cape, whereas for other provinces it is higher. This pattern at the provincial level is consistent across time. Also, to note is that the probabilities of migration for Zimbabwean-born migrants have significantly dropped over time for all migrants' resident in each of the nine provinces.

5 DISCUSSIONS AND CONCLUSIONS

5.1 Introduction

This section presents a summary discussion of the results considering background descriptive statistics of migrants presented in Chapter 3. The discussion specifically seeks to reconcile the findings and link them to the migration theory framework discussed in Chapter 2 considering earlier findings from the literature. In the process, answers to questions posed in this study are also discussed.

5.2 Discussion of results

The main purpose of this study has been to analyze and describe the patterns and dynamics of international as well as the internal migration of the Zimbabwean-born population in South Africa based on both the 2011 population census and 2016 Community Survey. First, results from descriptive statistics in Chapter 3 show that in aggregate, there were more Zimbabwean-born population recorded in the 2011 Census (674 056) than in the 2016 CS (574 047). Focusing on migration 5 years before the census and/or survey, the total number of internal migrants for the period 2006-11 is significantly higher than that for the later period 2011-16 as extracted from the two data sources. In the period 2011-2016, 126 490 Zimbabweans (22 per cent of total Zimbabwean-born population recorded) migrated compared to 321 464 (48 per cent of total) in the earlier period, 2006-2011. These numbers suggest that the supply of migrants from outside South Africa declined from 283 763 in 2011 to 114 574 persons in 2016. This decline in the level of mobility for Zimbabweans over time, although noteworthy, raises some questions on whether the 2016 CS captured all the migrants.

In light of these observations, it is important to acknowledge that, poor coverage due to sampling errors especially in the 2016 CS whose estimate depends on the 2015 mid-year estimates (whose assumptions are not fully known) lead to counted migrants population representing a relatively small proportion of the overall population. Also, the fact that the data collection on both datasets depends on declarations by migrants means that the available data show only self-declared or documented migrants, missing many undocumented migrants. Illegal migrants have a tendency for misreporting migrant status (for example, some migrants may declare themselves as citizens due to language similarities) or fear to step forward for counting due lack of proper documentation. This unwillingness to report leads to non-inclusion of certain groups of immigrants leading

to underestimation of international migration. The prevalence of undocumented recent migrants who themselves might not be easy to identify especially in a survey result in low estimates of overall migration. Also, concerns on recent internal migration data failing to capture a significant proportion of moves, and concerns on the quality of the 2016 CS poses difficulty in both ascertaining whether migration over time declined or not and deriving the reasonableness of both these estimates, hence, any interpretation should be treated with caution considering the observations data quality issues presented earlier in this study.

Another key concern of the aggregate numbers from both surveys is that these estimates are inconsistent with the wide range of estimates in the literature discussed in Chapter 3 which, however, reflects on the difficulty to quantify the total numbers of the Zimbabwean-born population living in South Africa.

Despite these strong concerns about data quality and discrepancies observed in aggregate numbers from the two sources, there are important features to be learned on Zimbabwean migration to South Africa. Firstly, pre-arrival migration seems generally to lead to concentration in three major provinces of South Africa. Results of the analysis in Table 4.3 and Table 4.4 show that the main provinces of destination for Zimbabwean-born migrants are Gauteng (GP) (highest number of migrants), Western Cape (WC) and Limpopo (LP). Most of these migrants are mainly concentrated in the metro areas of the respective provinces namely Cape Town (WC), Vhembe (LP) and Gauteng (combined) metros. The main sending provinces are Gauteng, Eastern Cape, and Limpopo, although the numbers are relatively small. This pattern is consistent for both the 2006-2011 and 2011-2016 period, which shows that the pattern of concentration of new immigrants in the major receiving provinces of the country is likely to continue.

These results also show that the distribution of previous immigrants plays a significant role in retaining and attracting new immigrants into these destinations. Also, the economic circumstances of destinations (for example, Gauteng and the Western Cape provinces) and geographical proximity to the home country and/or demand for farm labor (in the case of Limpopo) chiefly contribute to the concentration of these migrants. However, this does not mean that social networks of kinship and friends do not matter; these also play a significant role in attracting immigrants to respective destinations. These results are consistent with Polzer (2008), who states that Zimbabwean migrants are neither all concentrated in one part of South Africa nor dispersed evenly across it

Second, the findings from both datasets show that the migration stream is male-dominated and concentrated particularly between ages 15 to 40 years. In addition, Table 3.2 results show that of the total migrants, the proportion of female migrants increased whereas that of males decreased between 2011 and 2016. This is consistent with findings of Crush, Chikanda and Tawodzera (2015) and Makina (2008). In their respective studies, the authors found that Zimbabwean migrants in South Africa comprise mostly males, with a continued increase in the proportion of working-age migrants; they also noted that the proportion of female migrants is rising. In general, these findings are congruent with Ravenstein's fifth law which in summary states that most migrants are adults and that migration is sex-selective.

Other noticeable features in the migration patterns and trends of Zimbabwean migrants, for example, Northern Cape has the least number of migrants for both periods, which is not surprising, considering the population of this province and migration seems to be highly effective into North-West, proportionally receiving more recent migrants relative to those already there, compared to all other provinces for both interval periods.

Focusing on the internal movement of Zimbabwean-born migrants in South Africa for both periods, the results show that post-immigration migration is not necessarily significant to the redistribution of migrants. This is shown in Table 4.2, where internal movers make about 11.7 per cent and 9.4 per cent of total movers recorded for the period 2006-2011 and 2011-2016 respectively. Although redistribution after immigration seems to have a generally small-scale counter-balancing effect on changing concentrations at pioneer settlements, the results of this study revealed a number of migration streams. The most noticeable was a 'coastal migration system' connecting the three coastal provinces Western Cape, Eastern Cape, KwaZulu-Natal, and Gauteng, predominantly from these coastal provinces to Gauteng province. Interestingly, Gauteng consistently remains strongly associated with other provinces as both a major origin and destination for migrants hence it forms the focal point of migrants' distribution across the country and this is consistent from both datasets. This probably reflects its economic and industrial significance in South Africa. Other streams were between the Gauteng, Mpumalanga, and Limpopo (with most of the in-migration to Gauteng coming from Limpopo province). The direction-specific connection between Limpopo, Gauteng and Western Cape shows some evidence that of those who move, do follow a stepwise-pattern of migration, gradually progressing to centers of

commerce and industry through some incremental stops and this is consistent over the two periods.

An extension of this analysis to district level shows interesting results, for example, there is a strong connection between Gauteng metros combined and the city of Cape Town. This migration stream is dominated by young children (accompanied by adults) moving both from and into the city of Cape Town. There is also a strong connection between Vhembe and the rest of Limpopo, dominated by young adult migrants. Interestingly, elderly immigrants are less likely to migrate to the city of Cape Town and the rest of the Western Cape compared to other age-groups, which might reflect familial and distance constraints. In particular, post-arrival migration behaviour tends to focus mainly on metros, namely, Cape Town, Vhembe and Gauteng metros combined.

Descriptive statistics of individual characteristics of migrants (movers vs non-movers) revealed several important findings. Firstly, in aggregate, the results show that most Zimbabwean-born migrants in South Africa are married young adults, with secondary or higher education, and are employed. These characteristics are consistent for both datasets, showing evidence of pre-migration selection by age, marital status, and education. Also, the fact that most migrants are of working age and are employed supports the view that Zimbabwean migrants are economic migrants, which is line with Ravestein's sixth 'law of migration' where he observed the pre-dominancy of the economic motive for migration. Secondly, in terms of post-immigration migration, there are relatively fewer movers than non-movers in aggregate, showing evidence of largely increasing visible concentrations in certain parts of the country.

A further analysis of secondary migration using a logistic regression framework identified characteristics of internal movers. Within this framework is an assessment to determine how certain renowned socio-economic and demographic factors affect the likelihood of migrants to move from pioneer provinces of settlement. The results from this analysis show that secondary migration is influenced by various factors, and clearly, demographic dimensions such as age and sex are important selective effects. Other factors such as marital status, education level, arrival time and province of residence are significantly related to the internal movement of migrants.

Focusing on these characteristics and how they affect internal migration propensities, results of this study show that among movers, age has a positive effect on post-immigration movement, thus as age increases, the more likely an individual is to

move. Gender disparities in the propensity to move are also evident, with women less likely to move than men. Controlling for education, employment status is not a factor in internal migration. This study has shown that there is a higher likelihood to move for older people, the uneducated, and those not in unions. Province of residence as a factor also plays a significant role: following the migrant concentration trajectory, migrant's resident in immigrant magnets such as Gauteng have lower chance to move compared to those in other provinces. This observation is consistent with those observed from the multiplicative component (TODA) framework for both periods. This shows the importance of Gauteng, the Western Cape, and Limpopo as main destination provinces having both a 'pull' effect and retention capacity.

A comparison of 2011 and 2016 data for consistency of effects of each variable on migration propensities shows some interesting results. First, the incremental effect of age observed above is generally consistent for both periods. Second, the difference in the probability of moving, between male and female migrants is also narrowing down over the two periods (see Figure 4.11). This trend indicates an overall decline of the propensity to internally migrate over time.

For both periods, the results also show that migrants residing in Gauteng, Western Cape and Limpopo respectively are less likely to move compared to those in other six remaining provinces. This retention capacity of the provinces is probably one reason why the provincial distribution of these migrants in South Africa seems rather static over time, with no alteration of their geographic concentration.

5.3 Limitations

First, the multiplicative component model is a flexible and powerful framework for analyzing migration flows, but the size of the inter-provincial migration stream is insufficient to characterize the flows of migrants for most of the provinces. Small numbers and/or 'zero' entries inflate interaction components limiting the validity of the implied patterns of association between provinces or metros. In general, this limits the application of the multiplicative component model to areal units that are too small, especially the age interaction extension of the model where most observations by age were either 'zeros' or small at older ages for most provinces. Therefore, much caution was exercised not to over-interpret some of the interaction component results.

Second, using the logistic regression analysis, the data was not comparable in all cases due to the unavailability of some variables. In fact, among the chosen characteristics, the variable on 'employment status' was not measured in the 2016

Community Survey whereas it is available in the 2011 census. This meant that comparison of distributions by employment status over the two five-year periods was not possible. Also, to compare the effects of other factors across surveys, the employment status variable had to be dropped from the pooled data logistic regression model to standardize comparisons. This, however, introduces bias into these results, considering that a key factor is excluded.

5.4 Conclusion

Based on the findings of this study, it is difficult to tell whether the supply of Zimbabwean-born migrants into South Africa has declined, as well as the level of decline. Although the datasets show that there are slightly above 0.5 million Zimbabweans living in South Africa, the level of migration recorded in these two datasets, especially in the 2016 CS, remains questionable, considering that the two data sources are subject to under-coverage and under-registration of migrants.

Despite concerns on whether the surveys captured all migration in the country, there are important observations which address this study's main objective. The study findings show that Zimbabwean-born migrants are exclusively attracted to pre-existing immigrant preferred destination provinces reflecting the interplay of the economic circumstances at destinations, transport infrastructure and social networks of kinship and friends. In fact, the immigrant preferred destination provinces identified in this study showed net gains of this foreign-born population. Results at both the provincial and metropolitan level indicate that the existing patterns provide evidence of the selective concentration of migration and that internal migration did not necessarily lead to greater concentration, neither did it have a large-scale effect on changing concentrations at pioneer settlements as the geographic concentration of migrants remained unchanged over the two periods. Further evidence demonstrates that significant migrant population change occurred as a result of recent immigration to the major immigrant concentrations hence international migration has a huge impact in supplying migrants, and the pattern is consistent over the two periods.

It is therefore recommended that migrant-focused interventions or any provision of support services targeting these migrants should concentrate most on these regions. These geographic concentrations deserve much greater attention to facilitate migrant integration and possibly develop structured economic inclusion in the informal sector such that the foreign-born can also contribute to the economy of South Africa. These results also reinforce the importance of looking at specific immigrant groups as opposed

to the immigrant population in general. More generally, the patterns observed in this study may suggest that the 'push' mechanism is not effectively operational in inter-provincial migration such that the Zimbabwean-born population settlement system has remained static over time. The conclusion to these observations is that post-immigration migration is not necessarily significant and does not vary over time.

The findings of this study also show that Zimbabwean-born primary migration patterns are largely selective by socio-demographic characteristics, thus they do not form a random sample. Despite the increasing proportion of females over time, male migrants still form a greater proportion than female migrants in South Africa, and the majority of the Zimbabwean migrants are married, economically active young adults. These results are largely consistent with literature as well as specific 'laws of migration' discussed. However, these findings do not comply with all the 'laws', for example; Ravenstein's first hypothesis that migration declines with distance. Rather the geographical location of immigrant concentrations suggests that distance (i.e. transport costs) has no significant effect on migration possibly due to reduced transport costs and improved road networks.

Finally, Zimbabwean-born population stocks and flows findings from both datasets show largely consistent migration patterns (but not levels) across certain basic characteristics, for example, the regular distribution by age, relatively dominated by the young adult population, proportional distribution by sex and province of residence (in South Africa). Evidence of such general regularities of migration flows certainly guarantee the usefulness of both censuses and surveys in understanding international migration patterns and dynamics which can aid the development of evidence-based migration policies. However, it is important to note that consistency or comparability do not guarantee the reliability of these datasets as they have limitations which led to flaws and errors in this study.

5.5 Areas of further research

In this study, there are several areas that require further research. First, we were not able to conclude on the true estimate of the total numbers of Zimbabwean-born population based on Census, Community Survey, and other literature-based estimates. Although to some extent, census-based migration estimates can be relied upon considering their sample coverage, further research is needed to use modern estimation techniques to estimate the numbers of Zimbabwean-born population in South Africa.

Also, further research could focus on internal migrations of the Zimbabwean-born population in South Africa, mainly to identify the characteristics of the movers for the main flows identified using TODA model in this study. To achieve this, a multinomial logit regression model with places of origin as determinants and places of destination as competing risks can be used. This controls for origin and destination using provinces as categories. Such further understanding would be essential to understanding the underlying composition of each characteristic flow.

In addition to the insights from this study, further research can also use the 2011 census to examine the structural changes, if any, which have occurred relating to labour participation of Zimbabwean migrants in South Africa. More precisely, these changes can be studied in terms of demographic and socio-economic characteristics, for example, examining the relationship between the individual characteristics and occupation status. This can also include a comparison of structural changes by migration status (for example, migrants and non-migrants).

Further studies can also utilize tables from the full 2011 Census for the descriptive analysis of the foreign-born population. This full census data will allow for better analysis particularly where migrants are small in number.

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APPENDICES

APPENDIX A: Net internal migration and recent immigrants by the district of enumeration in both 2011 and 2016.

Table A.1: Net migration of Zimbabwean migrants by districts, 2006-11 and 2011-16

	Period	
District(s)	**2006-11**	**2011-16**
Gauteng metros	3 314	-3 234
City of Cape Town	2 179	1 278
Western Cape Excl. Cape Town	-4 206	503
Vhembe	-1 077	-76
Limpopo districts excl. Vhembe	-1 077	417
Other Districts	867	1 113
Outside of South Africa	-283 869	-114 587

APPENDIX B: Relative migration propensities by age: Zimbabwean migrants

Table B 1: Provincial relative migration propensities by age: 2006-2011

	Origin										
Age	**WC**	**EC**	**NC**	**FS**	**KZ**	**NW**	**GP**	**MP**	**LP**	**OSA**	**Propn**
0-4	0.77	0.75	0.31	0.34	0.79	0.57	0.58	0.59	0.76	1.04	**0.06**
5-9	1.39	0.76	0.35	1.48	0.63	1.18	1.27	1.18	1.2	0.99	**0.04**
10-14	1.76	0.08	0.37	0.56	0.31	0.66	1.18	0.56	0.46	1.05	**0.02**
15-19	0.27	0.27	0.43	0.16	0.43	0.35	0.43	0.48	0.4	1.09	**0.06**
20-24	0.53	0.79	0.73	0.63	0.66	0.72	0.7	0.63	0.86	1.04	**0.25**
25-29	0.98	1.07	1.06	1.07	0.97	0.8	1.04	0.96	0.94	1.00	**0.25**
30-34	1.27	1.21	1.21	1.33	1.2	1.16	1.07	1.13	1.34	0.97	**0.15**
35-39	0.94	1.23	1.99	1.8	1.15	1.62	1.27	0.94	1.31	0.96	**0.08**
40-44	2.17	1.55	0.46	0.82	2.29	1.31	1.53	1.33	1.22	0.92	**0.04**
45-49	2.21	1.22	5.17	1.72	1.71	2.45	1.8	2.67	1.13	0.90	**0.02**
50+	0.86	3.45	2.17	3.81	2.9	5.39	2.32	7.03	1.36	0.77	**0.01**
Oi	**0.01**	**0.02**	**0.00**	**0.00**	**0.02**	**0.01**	**0.04**	**0.01**	**0.03**	**0.88**	**1**
	Destination										
Age	**WC**	**EC**	**NC**	**FS**	**KZ**	**NW**	**GP**	**MP**	**LP**	**OSA**	**Propn**
0-4	1.04	0.87	1.39	0.67	0.87	0.97	1.02	0.80	1.03		**0.06**
5-9	1.21	1.05	1.37	0.65	1.31	0.72	1.03	1.75	0.67		**0.04**
10-14	1.11	0.86	1.06	0.53	1.07	0.61	1.12	1.70	0.67		**0.02**
15-19	0.60	0.66	0.71	1.24	0.61	1.05	0.94	0.86	1.54		**0.06**
20-24	0.82	0.89	0.80	1.05	0.81	1.08	1.03	0.71	1.11		**0.25**
25-29	1.09	1.05	0.89	1.06	0.99	1.14	1.00	0.85	0.92		**0.26**
30-34	1.14	0.99	0.95	0.77	1.03	0.92	1.00	0.99	0.95		**0.15**
35-39	1.05	1.33	1.15	1.10	1.21	0.91	0.95	1.24	0.98		**0.08**
40-44	1.08	1.34	1.42	1.31	1.32	0.78	0.93	1.59	0.95		**0.04**
45-49	1.16	1.40	2.51	1.08	1.46	0.57	1.02	1.24	0.75		**0.02**
50+	1.15	0.85	1.38	1.73	1.58	0.75	1.00	2.57	0.52		**0.01**
Propn	**0.11**	**0.03**	**0.00**	**0.01**	**0.05**	**0.07**	**0.5**	**0.04**	**0.19**	**0**	**1**

Table B.2: Provincial relative migration propensities by age: 2011-2016

	Origin										
Age	**WC**	**EC**	**NC**	**FS**	**KZ**	**NW**	**GP**	**MP**	**LP**	**OSA**	**Propn**
0-4	1.02	1.90	1.12	1.32	0.45	0.87	1.03	1.76	0.05	1.08	**0.01**
5-9	1.21	0.89	1.54	1.65	0.62	1.67	0.41	0.45	0.17	1.06	**0.05**
10-14	1.27	0.62	1.23	1.19	0.56	1.45	0.55	0.44	1.19	1.05	**0.03**
15-19	1.30	1.20	1.32	0.60	0.46	1.91	0.57	0.66	0.45	1.05	**0.09**
20-24	0.34	0.11	0.80	1.13	0.29	0.40	0.51	0.69	0.52	1.05	**0.26**
25-29	0.59	1.21	0.88	0.86	1.02	0.90	0.85	0.42	0.96	1.02	**0.24**
30-34	0.98	2.22	1.00	1.22	1.37	1.01	1.68	1.42	1.46	0.95	**0.16**
35-39	1.62	1.03	1.00	2.00	2.24	1.25	1.24	1.95	1.80	0.95	**0.09**
40-44	4.99	1.26	5.91	1.00	2.18	4.14	2.43	1.07	3.19	0.83	**0.04**
45-49	0.80	2.92	2.82	4.91	3.11	1.13	2.14	5.32	1.33	0.86	**0.02**
50+	4.70	3.65	1.01	1.18	0.00	0.00	2.24	0.00	2.10	0.91	**0.01**
Propn	**0.01**	**0.01**	**0.00**	**0.00**	**0.01**	**0.01**	**0.05**	**0.01**	**0.01**	**0.91**	**1**
	Destination										
Age	**WC**	**EC**	**NC**	**FS**	**KZ**	**NW**	**GP**	**MP**	**LP**	**OSA**	**Propn**
0-4	1.07	1.42	0.56	0.66	1.39	1.65	1.00	0.82	0.70		0.01
5-9	0.93	0.73	0.75	0.54	1.70	1.13	1.06	1.08	0.81		0.05
10-14	1.68	1.35	0.62	0.71	1.60	0.55	1.00	1.08	0.64		0.03
15-19	1.03	0.80	0.43	0.90	0.46	0.89	0.91	0.82	1.41		0.09
20-24	0.81	0.71	1.12	1.08	0.59	1.09	1.07	0.89	1.06		0.26
25-29	0.94	1.16	0.77	1.09	0.97	0.97	1.01	0.99	1.00		0.24
30-34	0.93	1.04	1.34	0.94	1.37	0.97	0.98	1.16	0.98		0.16
35-39	1.18	1.03	1.76	0.94	0.99	1.04	1.02	1.04	0.79		0.09
40-44	1.46	1.60	0.48	0.57	1.07	0.93	0.88	0.97	0.96		0.04
45-49	1.28	0.66	1.91	2.23	1.91	1.32	0.73	1.73	0.93		0.02
50+	1.20	0.40	2.48	1.57	2.09	0.82	0.88	0.68	1.07		0.01
Propn	**0.12**	**0.04**	**0.01**	**0.01**	**0.04**	**0.07**	**0.45**	**0.04**	**0.21**	**0**	**1.00**

Table B.3: Relative migration propensities by age (metros and non-metros): 2006-2011

	Origin							
Age	**Western Cape Excl. Cape Town**	**Gauteng Metros**	**Other districts**	**Limpopo excl. Vhembe**	**City of Cape Town**	**Vhembe**	**OSA**	**Propn**
0-4	0.78	0.59	0.74	0.92	0.78	0.90	1.19	**0.05**
5-9	0.92	1.03	1.05	1.03	1.20	0.72	0.98	**0.04**
10-14	0.37	1.15	0.47	0.62	1.68	0.49	0.99	**0.02**
15-19	0.39	0.62	0.59	0.97	0.61	0.68	1.22	**0.06**
20-24	0.83	0.82	0.68	0.94	0.61	1.05	1.12	**0.23**
25-29	0.99	1.05	0.95	0.95	1.06	1.05	0.98	**0.26**
30-34	1.14	1.18	1.03	1.14	1.17	0.96	0.91	**0.16**
35-39	0.95	1.21	1.26	1.00	1.14	1.25	0.90	**0.09**
40-44	1.33	1.18	1.64	1.02	1.40	1.37	0.85	**0.05**
45-49	1.55	1.32	1.76	1.05	0.99	0.53	0.81	**0.02**
50+	2.89	1.23	2.76	0.97	1.53	0.72	0.70	**0.01**
Propn	**0.03**	**0.24**	**0.04**	**0.02**	**0.03**	**0.01**	**0.63**	**1**
	Destination							
Age	**Western Cape excl. Cape Town**	**Gauteng Metros**	**Other districts**	**Limpopo excl. Vhembe**	**City of Cape Town**	**Vhembe**	**OSA**	**Propn**
0-4	0.82	0.96	0.98	1.15	1.12	1.17		**0.05**
5-9	0.98	1.01	1.14	0.65	1.21	0.77		**0.04**
10-14	0.66	1.09	0.86	0.62	1.41	0.65		**0.02**
15-19	0.63	0.91	0.95	1.65	0.70	1.83		**0.06**
20-24	0.95	1.00	0.94	1.16	0.79	1.24		**0.23**
25-29	1.04	1.01	0.99	0.94	1.06	0.89		**0.26**
30-34	1.05	1.03	0.90	0.90	1.09	0.88		**0.16**
35-39	0.99	1.01	1.06	0.89	1.02	0.89		**0.09**
40-44	1.14	0.97	1.15	0.96	1.09	0.68		**0.05**
45-49	1.34	1.03	1.09	0.72	0.98	0.68		**0.02**
50+	1.42	0.95	1.45	0.44	1.18	0.61		**0.01**
Propn	**0.04**	**0.57**	**0.15**	**0.09**	**0.09**	**0.05**	**0**	**1**

Table B.4: Relative migration propensities by age (metros and non-metros): 2011-2016

Age	Origin							
	Western Cape excl. Cape Town	Gauteng Metros	Other Districts	Limpopo excl. Vhembe	City of Cape Town	Vhembe	OSA	Propn
0-4	0.46	0.42	0.94	0.43	0.34	0.95	1.42	**0.01**
5-9	0.53	0.50	0.69	0.59	1.53	0.36	1.30	**0.04**
10-14	1.00	0.77	0.64	1.10	1.66	0.79	1.11	**0.03**
15-19	0.39	0.43	0.67	0.55	0.46	0.59	1.42	**0.06**
20-24	0.43	0.60	0.58	0.63	0.54	1.00	1.32	**0.21**
25-29	1.07	1.01	0.82	1.10	0.77	1.13	1.02	**0.24**
30-34	1.51	1.26	1.11	1.37	1.04	1.37	0.81	**0.18**
35-39	1.01	1.40	1.59	0.96	1.31	0.64	0.72	**0.11**
40-44	1.21	1.54	1.40	1.62	1.62	1.15	0.60	**0.06**
45-49	1.87	1.52	1.93	1.30	1.77	0.96	0.54	**0.03**
50+	2.99	1.46	1.28	1.28	0.94	1.34	0.63	**0.01**
Oi	**0.02**	**0.29**	**0.06**	**0.02**	**0.04**	**0.01**	**0.56**	**1**
	Destination							
Age	**Western Cape excl. Cape Town**	**Gauteng Metros**	**Other Districts**	**Limpopo excl. Vhembe**	**City of Cape Town**	**Vhembe**	**OSA**	**Propn**
0-4	1.16	0.90	1.46	0.68	1.00	1.02		**0.01**
5-9	0.66	0.92	1.28	0.99	1.38	0.88		**0.04**
10-14	1.47	0.93	0.92	0.83	1.70	0.64		**0.03**
15-19	0.79	0.83	0.89	1.44	1.12	1.99		**0.06**
20-24	0.80	0.98	1.00	1.12	0.84	1.35		**0.21**
25-29	1.12	1.02	0.94	1.12	0.86	0.93		**0.24**
30-34	1.05	1.03	0.99	0.97	0.90	0.89		**0.18**
35-39	0.87	1.10	1.05	0.66	1.06	0.58		**0.11**
40-44	1.06	1.07	0.83	0.88	1.23	0.65		**0.06**
45-49	1.19	0.98	1.23	0.71	1.10	0.71		**0.03**
50+	1.12	1.02	1.09	0.55	0.96	1.14		**0.01**
Dj	**0.06**	**0.54**	**0.15**	**0.08**	**0.09**	**0.07**	**0**	**1**

APPENDIX C: Migrants characteristics, 2006-2011 and 2011-2016

Table C.1: Descriptive characteristics of Zimbabwean-born migrants in South Africa (adults aged 15+ years) based on the 2011 census and 2016 CS.

	2006-2011				2011-2016			
	Movers		Non-movers		Movers		Non-movers	
Variables	**%**	**(N)**	**%**	**(N)**	**%**	**(N)**	**%**	**(N)**
Total	20.7	35 813	79.3	137 113	13.2	11 442	86.8	75 029
Age								
15-19	14.5	956	85.5	5 615	20.7	557	79.3	2 128
20-24	20.4	7 173	79.6	27 983	13.2	1 502	86.8	9 887
25-29	19.8	10 082	80.2	40 774	11.5	2 427	88.5	18 757
30-34	20.2	7 026	79.8	27 719	13.6	2 855	86.4	18 202
35-39	20.0	4 056	80.0	16 192	10.7	1 521	89.3	12 634
40-44	23.1	2 524	76.9	8 396	16.1	1 323	83.9	6 909
45-49	23.6	1 294	76.4	4 191	12.0	465	88.0	3 415
50+	29.0	1 027	71.0	2 515	11.3	147	88.7	1 152
Sex								
1. Male	23.3	23 169	76.7	76 072	14.7	7 020	85.3	40 831
2. Female	17.2	12 643	82.8	61 041	11.4	4 422	88.6	34 198
Marital status								
1. Not married	21.2	12 515	78.8	46 474	15.7	4 251	84.3	22 883
2. Married or living with pa	20.5	22 032	79.5	85 629	11.8	6 702	88.2	49 865
3. Separated, divorced or	20.2	1 265	79.8	5 010	17.6	489	82.4	2 281
Educational level								
1. No education	24.9	1 192	75.1	3 590	12.9	578	87.1	3 885
2. Primary	23.3	2 790	76.7	9 197	9.8	629	90.2	5 789
3. Secondary or higher	20.4	31 831	79.6	124 325	13.5	10 235	86.5	65 355
Employment status								
1. Not employed	19.3	9 828	80.7	41 207		-		-
2. Employed	21.3	25 985	78.7	95 906		-		-
Arrival time (years)								
0-5	22.6	25 244	77.4	86 440	14.8	3 931	85.2	22 643
6-14	14.5	5 577	85.5	32 973	12.1	5 720	87.9	41 579
15+	22.7	4 192	77.3	14 285	13.7	1 645	86.3	10 334
Province of current residence								
1. Western Cape	26.9	5 262	73.1	14 294	22.2	2 137	77.8	7 480
2. Eastern Cape	29.0	1 441	71.0	3 526	26.6	1 049	73.4	2 892
3. Northern Cape	46.5	370	53.5	425	35.8	256	64.2	460
4. Free State	47.4	811	52.6	899	32.7	257	67.3	528
5. KwaZulu-Natal	32.3	2 645	67.7	5 545	22.3	519	77.7	1 806
6. North- West	52.7	3 552	47.3	3 187	39.9	1 740	60.1	2 620
7. Gauteng	13.6	15 474	86.4	98 338	5.1	2 752	94.9	51 584
8. Mpumalanga	57.3	2 559	42.7	1 906	31.3	1 184	68.7	2 595
9. Limpopo	29.1	3 700	70.9	8 993	23.4	1 547	76.6	5 065

Note: numbers are weighted.
Source: South African 2011 Census and 2016 Community Survey

Table C.2: Interaction regression model results from the 2011 census: 2006-2011

Characteristics	b (Coefficient)	(SE)	odds ratio
Age			
15-19	-0.582***	0.04	0.559
20-24	-0.112***	0.02	0.894
25-29	-0.102***	0.02	0.903
30-34(ref)	-	-	1
35-39	-0.037	0.02	0.963
40-44	0.101***	0.03	1.106
45-49	0.201***	0.04	1.222
50+	0.419***	0.04	1.521
Sex			
1. Male (ref)	-	-	1
2. Female	-0.272***	0.01	0.762
Marital status			
1. never married (ref)	-	-	1
2. married or living with partner	-0.095***	0.01	0.909
3. Separated, divorced or widowed	-0.192***	0.04	0.825
Educational level			
1. no education (ref)	-	-	1
2. primary	-0.314***	0.04	1.000
3. secondary or higher	-0.557***	0.04	0.812
Employment status			
1. not employed (ref)	-	-	1
2. employed	0.036*	0.02	1.036
Employment_status#educ_level			
1. No educ # 2. em~d	0.00	-	-
2. Primary#2. employed	0.507***	0.09	1.659
3. Secondary or higher#2. employed	0.555***	0.08	1.742
Arrival time (years)			
0-5 (ref)	-	-	1
6-14	-0.469***	0.02	0.626
15+	-0.287***	0.02	0.751
Province of residence			
1. Western Cape	0.792***	0.02	2.208
2. Eastern Cape	0.928***	0.03	2.529
3. Northern Cape	1.493***	0.07	4.450
4. Free State	1.694***	0.05	5.443
5. KwaZulu-Natal	1.026***	0.03	2.790
6. North-West	1.902***	0.03	6.698
7. Gauteng (ref)	-	-	1
8. Mpumalanga	2.049***	0.03	7.760
9. Limpopo	0.879***	0.02	2.409
Constant	-1.322***	0.04	0.266
(N)	172926		

* p<0.05, ** p<0.01, *** p<0.001